

WEB, MOBILE AND COMPUTER ACCESSIBILITY: ISSUES FACED BY THE SRI LANKAN VISUALLY IMPAIRED COMMUNITY

N Wedasinghe¹, N Sirisoma², and APR Wicramarachchi³

^{1,2}General Sir John Kotelawela University, Ratmalana, Sri Lanka

³University of Kelaniya, Sri Lanka

¹*niroshaw@hotmail.com*

Abstract- Though Information Technology and Internet provide benefits to their customers, there is still a gap existing between none-differently abled and differently abled users. This gap is known as Disability Digital Divide. When compared to none-differently abled, differently abled users face a disadvantage when accessing these technologies. In Sri Lankan context, there is no proper planning or guidelines to overcome these issues specifically faced by the visually impaired community. Therefore, this research focuses on addressing those issues and finding constructive solutions. The study focuses on three main research questions. Firstly, it identifies the problems and issues faced by visually impaired people when accessing personnel computers, mobiles, Internet and web related technologies. Secondly it concentrates on technological accessibility related issues in relation to these technologies and finally, how the above problems and issues can be rectified. This study was conducted by engaging in in-depth interviews with visually impaired individuals and observing Computer, Web and mobile accessibility issues. Snowball sampling was used and this research directly benefits visually impaired community allowing them to overcome the obstacles, problems and issues they are facing in their day to day life in the context of Information accessibility. Findings indicated that, current websites failing to adhere to Web Accessibility guidelines, difficulties in software accessibility, human perception on technology, financial difficulties to purchase and use of equipment are the major issues. Solutions recommended to overcome such issues and improve the accessibility among the Sri Lankan

community include standardization of web and internet facilities, concentration on user friendliness in software development processes, infrastructure development, and financial support for visually impaired people and special training and education on technology with proper guidance.

Keywords- Web Accessibility, Mobile Accessibility, Computer Accessibility, Information Accessibility, Visual Impairment

I. INTRODUCTION

For most people, technology makes things easier. For people with disabilities, technology makes things possible". The often-cited quote by Mary Pat Radabaugh, former Director of IBM National Support Center for Persons with Disabilities, sums up the importance of technology in the process of empowering persons with disabilities (National Council on Disability 1993). The exclusion and marginalization of persons with disabilities is a human rights issue as well as an economic issue for countries. When a significant section of society, estimated at 15% of the world population, faces obstacles in receiving education, transitioning into the labor market, and becoming economically self-sufficient, it does not only undermine their rights and dignity but also adds significantly to a country's welfare burden (WHO and World Bank, 2012).

Though Information Technology and Internet provide more benefits to their customers, but there is still a gap between none-differently abled users and differently abled users. This gap is known as Disability Digital Divide.

Among that disadvantage group according to principle of School for the blind Rathmalana stated that blind and visually impaired individuals are the most marginalized group. This has been caused by a number of conditions such as poverty, self-employment, lack of education, getting discouraged to obtain computer literacy due to lack of support. Hollier (2007) also indicated that most disadvantaged group among the differently abled community is the visually impaired community. Wedasinghe, Wicramarachchi and Sirisoma (2017) disability digital studies related to information accessibility also stated that visual impaired community become the most disadvantaged group among the differently abled community.

However, when considering Sri Lankan context there is no proper planning or guidelines to overcome the disability digital divide issues faced by the visually impaired community in Sri Lanka. Therefore it is necessary to identify current problems they face and find constructive solutions to overcome such current issues in Sri Lanka.

This study focuses on three main research questions such as; What are the problems and issues faced by visually impaired people when accessing personnel computer, mobile, Internet and web related technologies in Sri Lanka?, Are there any technological accessibility related issues in the computers, mobile technology and web related technologies experienced by visually impaired community of Sri Lanka? , How the above problems and issues related in the context of Sri Lanka, can be overcome specifically for vision impaired people?.

The significance of this research can be identified as a new dimension of bridging the disability digital divide in relation to visually impaired community. And it is also contributes to Sri Lankan society by identifying means to overcome the disability digital divide.

II METHODOLOGY

A. Study Design

This research is conducted as a second phase of study. First phase of this study conducted as a survey in relation

to differently abled community and the second phase of this study is a qualitative based study. First part of this study has been exploring that out of all differently abled community in Sri Lanka, the most disadvantage community is visual impairment community. In addition to that survey conducted by censer and statistics department of Sri Lanka (2014), indicated that out of all disabled categories 54% of them are suffering from visual impairment. Therefore, this phase focuses to study in-depth interviews and observations to identify the information accessibility related issues faced by the blind community in relation to Sri Lankan context.

B. Study setting

In the first phase of this study has been conducted to identify the Information accessibility related problems and issues faced by the differently abled community in Sri Lanka. Therefore In this phase consider only visually impaired community. This study is setting to conduct in-depth interviews with visually impaired individuals and observations of Computer, Web and mobile accessibility issues among visually impaired community in Sri Lanka.

C. Target Population

The Target population for this study is visually impaired community in Sri Lanka. According to the Department of census and statistics 2014 indicating total visual impaired population in Sri Lanka is 996939 and they are including with blind and partially impairment on vision. However the technology usage by this community is not identified based on the web, mobile and computing.

D. Sample size

Since this is a qualitative research the issue of sampling has little significance as the main aim of most qualitative inquiries is either to explore or describe the diversity in a situation, phenomenon or issue. Qualitative research does not make an attempt to quantify the findings size of the sample is not an important issues. In this research saturation point will be consider. Therefore, in this research we are using non-probability sample until reaching the saturation point.

E. Sampling method and participants

Since this phase is using qualitative approach, sampling method will be used for this study is snowball sampling. Snowball sampling is the process of selecting a sample using networks. To start with, A few individuals in blind or visually impaired organization be selected. They are then asked to identify other people in the group or organization, and the people selected by them become a part of the sample. This process is continuing until the required number or a saturation point has been reached, in terms of the information being sought.

F. Inclusion and Exclusion criteria

Participants were all visual impaired individuals with having different capacity of vision impairments. It is including with the individuals who are totally blind or some form of a vision difficulties. This could be happen from the birth itself or at the part of their life. The participant need to be interesting and awareness of computer, mobile or Internet.

The individuals who do not know about Information accessibility on either one of technology discussed above will be excluded from this research. In addition to this the age group below 10 years and the people who are having eye vision with mental disorders also excluded with this research.

III EXPERIMENTAL DESIGN

In this study, first researcher will be contact initial network through School for the blind Rathmalana. This institute is located near to General Sir John Kotelawala Defence University. Therefore In order to make an initial network will be convenient. The requesting letter to giving permission researcher to collect data form the visual impaired community from the faculty of graduate studies collected and send to principle of the school for the Blind. With the approval from the principal researcher can collect data from the visual impairment community. In addition to that individual who are having visual impairment was interviewed to obtain findings.

All the potential participants will be given an invitation letter with a detail information leaflet written in appropriate lay language [English,Sinhala]. This

information leaflet describes the purpose of the study, why they have been chosen, anonymity, risk and benefits of participation. The participants given time to read and understand the information leaflet. Since this target group is blind or vision difficulties, Softcopy of the information leaflet will be given to listen via screen reading software. The participant can be request any form of leaflet. According to the participant choice brail version of the information leaflet can be produce. If the participant is with a dependent this information leaflet can be share with them and discuss before deciding to take part in the study.

After they agree to participate for this study, participant will be contact via phone they would like to participate in the study and the opportunity will be given to answer questions they may have about the study. After agree to take part in the study, a convenient date and time location will be arranged for in-depth interviews. However, if following this discussion the participant would like more time to consider their participation. Follow up call given before start the in-depth interview.

If the participant agrees to take part in-depth interviews, immediately prior to the interview taking place, signed consent obtains from each participant. It made clear to the participant their participation is on a voluntary basis and that they do not have to participate if they do not wish to do so, and can refuse to answer any questions at any time or terminate any point during the interview. At any given point participant can opportunity to as anything about the research and the purpose of asking such questions, detail description about the research.

Participant will be informed of their right to withdraw from the study before or during the survey and up to one month after their date of data collection. If they choose to withdraw and remove the data from the research, those data will be not taken in this research. However it will be made clear to participants that if they choose to withdraw after a period of one month.

A. Data Collection and Planned Investigations

In this research data collected with using in-depth interviews. This in-depth interviews researcher will make sure that the risk of providing this data in minimal. Minimum risk means that the extent of harm or discomfort in the research is not greater than that

ordinarily encountered in their daily life. Avoiding bias of the answers to the relevant questions researcher will be not influence philosophical idea on this blind community. The collected raw data will be editing before analysis and made conclusion. All the data collecting through an in-depth interview recoded in audio format. This will be further listen for clarifications.

B. Data Entry and analysis

The collected recording data will be entered in to the form of text format based on the themes which are aligning to research objectives. Context analysis will be used to analysis the collect data which means to identify the main themes those emerge from the responses given by the interviewees. Following steps followed to coding to descriptive data.

Step 1 : Identify the main themes. Researcher will be carefully go through descriptive given responses by the interviewee to each question to clarify the correct meaning. Different meanings used for the same word identified in this step. This theme used as a basis to analysis the data.

Step 2 : Assign codes to the main themes. This step is follow to identify the number of times a theme has occurred in an interview. This themes will be written and assign a code to it.

Step 3 : Classify responses under the main themes: Having identified the themes, then transcripts of all interviews and classify the responses under the different theme. NVivo qualitative data analysis software used to analysis of data.

Step 4 : Integrate themes and responses into report. Finally all the findings will be integrate and include in the report.

C. Plan for dissemination of Findings

The research findings will be shared through the publicly in the form of a thesis. In addition to that findings disseminate in the form of oral presentation or poster in scientific sessions, academic forums, conferences and papers written to high impact, open access academic journals. Significant findings shared with the Information and communication Technology Authority (ICTA) and

contribute towards policy formulation. In addition to that findings shared publicly to improve the awareness and increase support visual impaired community in Sri Lanka.

IV. RESULTS AND DISCUSSION

Problems and issues faced by visually impaired people further discuss (Table 1) based on the three accessibility areas on computer, Mobile and Internet or web.

Table 1. General Problems faced by Visual impaired community in Sri Lanka

Accessibility Type	Problem
Computer	<ul style="list-style-type: none"> • Screen Reading Software compatibility issues • Not familiar with the Software • Key board arrow keys are not supporting • attitudes toward to computer accessibility • Language fluency
Mobile	<ul style="list-style-type: none"> • Uneasiness of touchable smartphone • Screen size • Complexity of items
Web	<ul style="list-style-type: none"> • Expensive to use Internet Data

A. Accessibility of personnel computer

According to the findings identified barriers grouped into three functional categories: barriers to providing computer input, interpreting output, and reading supporting documentation.

The main Computer input barrier for this community is supporting screen reading software is not familiar to some computer users. Some expert users who are daily using computer in their day-to-day life are more convenience of using computers. Problem face by this community is depending on the level of vision impairment. People who are blind are using key board arrow keys. But if the relevant software is not supporting this functionality the people will be difficult and frustrated of using computers. They

feel that this machine is not for help them to simplify their life but complicated their work .In the observation it has shown level of usability of computer is related with their attitudes towards Computer accessibility. In addition to that practicing key board to this community is not simple as non- vision impaired or blind individual .Because they have to keep everything in their mind. Language fluency is another issue for accessibility of computer. Many supporting software are in the form of English language and not supporting Sinhala Unicode system.

B. Accessibility of mobile

Findings indicated that some blind people like to use keypad supportive mobile phones. They stated that touch system are not easy for them and difficulty of accessing. But some of them are prefer to use smart phone and the awareness of this technology among them is higher. They are getting much social interaction via this smart phone. But the people using touchable mobile phone are using their personal computers to communicate with new technologies. They are using social media like Facebook, Whatsapp etc. Visual impaired People with partially sighted vision capability are complained that functions available in the mobiles are sometimes complicated to understand.

C. Accessibility of Internet and web related technologies

In the Sri Lankan context Free Wi-Fi is a very rare experience for a visual impaired community. They are stated that expensiveness of getting Internet data from Internet providers are not affordable. This may cause lack of interesting of accessibility of Internet.

D. Technological difficulties of accessibility on computers

Getting licence software for them becomes a dream unless they are funding from a funding donor organization. Their self-finance is not capable to pay licence software. Therefore most of them are using crack version of software. This is an illegal and as a solution they can use open source software. Still they face this software are not familiars and user-friendly for them to use and make them uncomfortable.

Table 2: Technical problems faced by Visual impaired community in Sri Lanka

Accessibility Type	Problem
Computer	<ul style="list-style-type: none"> • Cost is unaffordable with licence software's and crack versions are using with limited access • Open source screen reading software are not user-friendly and voice is not human voice and users feel un-easiness
Mobile	<ul style="list-style-type: none"> • Low cost phones are available limited no of function • New Apps are unable to install • Some accessibility features are only available with Apple iPhones but not with other phone types
Web	<ul style="list-style-type: none"> • Web sites are not supporting screen reading software's • W3C guidelines are not followed by the web developers • Specifically, in Social media Pictures are not in transfer without description

E. Technological difficulties of accessibility on mobile technology

The main problem with them is that they are using old type phones are not providing additional support. But cost is less and affordable them financially. On the other hand many of new Apps are unable to install and some apps are built for only some platforms and not universally support.

F. Technological difficulties of accessibility on web related technologies

When they are using Internet the most critical problem they face is most of the website are not readable. The cause for this issue is when developing websites, they were not used W3C web accessibility Technology Agency of Sri Lanka (ICTA) also already given such guidelines. But

most of the websites are not using these web standards. Therefore, this community is getting disadvantage of using this web access. Another main problem they mention is when they are accessing graphics screen reading software is not transferring emotions and they are not able to understand the picture. Further they mention sometimes just saying three people are stand in a picture. But screen reading software is not mentioned the expressions of this three people. Therefore, visual impaired person is difficult of imagine and understand the way that a person is not having visual impairment identify about the same picture.

V. CONCLUSION AND RECOMMENDATIONS

According to the above identified problems and issues related in the context of Sri Lanka can be overcome specifically for vision impaired people in multiple ways.

Develop screen reading software with user-friendly and give them a proper training for them and make sure they came to satisfactory level and evaluate them will recommend.

Supporting training with computer keyboard functionalities for computer software will make improvement of the community.

Improvement of English language usability and IT technology usability make together will recommended implementing to improve the accessibility among this disadvantage community.

Sinhala Unicode support validate checking make compulsory for web site at least for the most popular and relevant web sites for visual impaired community.

When it comes to mobile phones double click method could be activated and training them will improve the accessibility of smart phone among this community.

Giving some special rate data packages for this community also recommended to improve the accessibility of this community.

Promote and funding to purchase licence software without illegal copywriting issue make them software accessibility improvement in an ethical environment.

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