CHAPTER 3
LITERATURE REVIEW

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Research is a spiral process. Any research project needs to build on the work of others. The present study also needed the support of several other researches and other literature. The objectives of the present research study were to identify the information needs of visually impaired students, the sources they used to fulfil them, and more importantly, identifying and understanding if the information needed was easily available and accessible to them. Another objective was to check the services offered to visually impaired people to facilitate access to information to fulfil their needs, by institutes and centres. Finally, the last objective of the study sought to verify the ease of accessibility of information on various websites. To meet these objectives a wide range of literature on different aspects of the study was reviewed.

The study was set in the context of the changing social and technological environments. The social context consisted of the way society looked at inclusion of the earlier marginalised people and at disability. The increasing use of the web in communication, education, and other areas of life define the new technological context. The development and use of assistive technology to access the web and other digital documents greatly influences the issue of information access to the visually impaired people. This review of literature begins with references to the social and technological contexts before describing literature on information needs and access.

3.1 THE SOCIAL CONTEXT
The social context included studying the literature of concepts like social inclusion, inclusive education, the varying definitions and changing attitudes towards disability.
3.1.1 Social Inclusion

The conviction underlying the present research was the first law of library science: “Books are for all”, including people with disabilities. The concept of inclusion was significant to the study. Therefore a literature review to understand these concepts was essential and thus was executed.

Literature on inclusion focussed mainly on social inclusion and inclusive education. Social inclusion was mainly covered from the view of inclusion of people irrespective of their race, gender and abilities. The relationship of social exclusion with social inclusion, and social inclusion with social cohesion was well clarified by Anver Saloojee (Saloojee, Social Inclusion, Citizenship and Diversity, 2001). Another work by Saloojee focussed on anti racism and democratic citizenship for social inclusion (Saloojee, 2003). Social exclusion was explained in depth from the perspective of meaning, measurement with reference to health inequalities by Mathieson, et al (2008). The concepts of social exclusion and social inclusion were reviewed and presented in the Nepalese context in another study (Pradhan, 2006). A report on social inclusion focussed on domains and sub domains of social inclusion; it also provided indicators of social inclusion, for example, the indicators for the sub domain of education are percentage with access to primary, secondary or higher education etc (Walker & Wigfield, 2004).

3.1.2 Inclusive Education

Inclusive education literature focussed on inclusion of children in education, overcoming a variety of barriers. The UNESCO guidelines on inclusive education state that the World Declaration on Education for All (EFA) sets out an overall vision: universalizing access to education for all children, youth and adults, and promoting equity. This requires nations to be proactive in identifying the barriers that many encounter in accessing educational opportunities and identifying the resources needed to overcome those barriers. The guideline describes inclusive education as a process of strengthening the capacity of the education system to reach out to all learners and thus is a key strategy to achieve EFA. The guideline describes reasons for exclusion
ranging from linguistic minority, migration, gender, poverty, children with disabilities etc (UNESCO, 2009). Many countries have an inclusive education policy; (Department of Education and Early Childhood Development, Brunswick, 2009); (The State of Queensland; Department of Education, Training and Employment), 2012); (Department of Basic Education, 2013).

In India too, policies and guidelines for inclusive education irrespective of religion, caste, gender economic status and disability have been laid down. (NIC, Department of Information Technology, 2007). Many studies specifically focussed on inclusive education of children with disabilities. (Giffard-Lindsay, 2007). The book by Madhumita Puri and George Abraham proved greatly beneficial to aid in understanding the concept of an inclusive school and how persons with different disabilities can be made integral participants in the education process without upsetting the apple cart (Puri & Abraham, 2004). The chapter on inclusive education for the disabled by J.L. Bhagat provided an overview of the topic including different aspects (Bhagat, 2009). A few other documents, although not specific to India, provided useful insights on the topic like recent status and trends (Access Ameri Corps, 2004); (UNICEF, 2013)

3.1.3 Disability

With disability as a major component of both social inclusion and inclusion in education, literature related to disability and specifically visual impairment was reviewed to gain a better understanding of the issues, factors involved, research trends and statistics.

The definitions of disability were varied, depending on the perspective and nation. The variations in the definition and descriptions; the reasons for variation were examined and understood using literature that provided detailed descriptions of the concept. (Venter, et al., 2002); (WHO, 2013). The book ‘Understanding Disability: Inclusion, Access, Diversity and Civil Rights’ provided an extended account of societal attitude towards disability, the issues and factors affecting people with disabilities (Jaeger & Bowman, Understanding disability : inclusion, access, diversity, and civil rights, 2005).
Disability affects a person’s life in many ways ranging from low self esteem to lack of independence, low communication and less social interaction. The effects were intricately described by many studies elaborating on the relationship between poverty and disability and its implications for education, employment and general life of people with disabilities. (Mohapatra, 2004); (Gill, 2009); Tom Shakespeare’s chapter aided in understanding the approaches and models of disability (Shakespeare, 1996). The medical model and social model of disability were described comprehensively by several documents (The Open University, 2006 a); (The Open University, 2006 b) (Wasserman, Asch, Blustein, & Putnam, 2011).

The legislation about the rights of people with disabilities is an important aspect in understanding the issues involved. Both international and national guidelines and legislation were examined. The international guidelines mainly include UN’s Convention on the Rights of Persons with Disabilities stating fifty articles covering various aspects of disability rights. The convention is signed by 170 countries including India (United Nations, 2006). In addition to the convention, almost all countries have national legislation for people with disabilities. India has three acts describing the rights, provisions, guidelines and policies for people with disabilities (Ministry of Social Justice and Empowerment, 2009). To take steps to safeguard the rights of persons with disabilities, the office of the chief commissioner for persons with disabilities has been set up. It redresses the grievances related to deprivation of rights of persons with disabilities and non implementation of laws, rules bye-laws etc. issued by the appropriate governments for welfare of persons with disabilities (Office of the Chief Commissioner for Persons with Disabilities, 2010).

Statistical sources were used to understand the current status and prevalence of disabilities. The recent World report on Disability (World Health Organisation and The World Bank, 2011) was the chief source to know the estimated figures of disability across the globe. The Indian scenario was clarified by some reports and certain papers reflecting on the prevalence. The Disability Manual (Ministry of Statistics and Programme Implementation, Central Statistics Office, 2012) was based on Census 2001 (The Registrar General &
Census Commissioner, India, 2011) that had collected data on disability for
the first time was the only official resource from India. (Although 2011 census
also collected data on disability, its report is not yet released). The World
Bank report on disabilities in India (The World Bank, 2007) gave an insight on
differences between the data collected by Census of India and National
Sample Survey Organisation of India along with the new estimates. Some
other analytical studies also contributed towards understanding prevalence and
some differences in statistics (Shekhar, 2009) and (Walia, 2010).

Since the present research focussed on students with visual impairment,
literature was reviewed to get acquainted with the definitions, issues, and
prevalence. The World Health Organisation’s web documents on visual
impairment (WHO, 2012), Manual on Disability Statistics (Ministry of
Statistics and Programme Implementation, Central Statistics Office, 2012) and
the Handbook of Visual Impairment aided in understanding the definition and
the impairments included under the term. (Punani & Rawal, 2000). Visual
impairment prevalence was presented by the World Report on Disability, the
Manual on Disability Statistics and the Report on Global Data on Visual
Impairments (WHO, 2012).

3.2 TECHNOLOGICAL CONTEXT

In the last several decades technological developments have changed the
information scenario completely. Further developments in the creation of
devices to help people with disabilities have been instrumental in improving
the quality of their lives.

3.2.1 Web Based Information

The Internet may well be both the present and the future of modern
computing, communication, commerce, information access, education,
employment opportunity and entertainment. There are numerous new websites
introduced every day. Government departments make their publications
available online; Universities conduct online classes that can be taken from
any location in the world. Almost everything exists on the web in one way or another. (Bohman, 2000)

Peter Lyman and Hal Varian estimate that well over 90% of information currently produced is created in a digital format, and anticipate this percentage will increase substantially in the future. At the same time, much existing content currently available only in physical formats will soon be digitized. The Internet Archive has already digitized many gigabytes of audio, video, and textual material. Google announced that it intends to digitize 15 million library books in the next few years. These trends suggest that the most useful information will be available in digital form within a decade. (Varian, 2005)

As the amount of digital information increases, there is a corresponding increase in the responsibility to ensure that information produced is made available and is accessible to all (Bohman, 2000).

3.2.2 Assistive Technology (AT)

A considerable amount of literature on Assistive Technology (AT) was referred to for the study. The literature helped in understanding what exactly was assistive technology, what were the specific devices which could be used by visually impaired people and how they functioned and looked like, their appropriate selection and use.

Hersh & Johnson’s book (2008) helped in the understanding of the aim of assistive technology. The technology helps persons with disabilities to overcome the gap between what they want to do and what the existing social infrastructure allows them to do. It consists of equipment, devices and systems that can be used to overcome the social, infrastructural and other barriers experienced by disabled people that prevent their full and equal participation in all aspects of society. AT allows people to perform various tasks which are impossible or more difficult to accomplish without it (enableall.org, 2012). They enable people with disabilities in a variety of ways to perform in different areas like education and learning, mobility and day to day activities.
There is a range of AT devices ranging from low–end devices like magnifying glass to high tech equipments like screen reading software, used as per the level of disability and the task to be performed.

The Internet has a large number of websites and articles which describe the various AT devices. (Dorigo, Harriehausen-Mühlbauer, Stengel, & Dowland) (Grönlund, Lim, & Larsson, 2010) (WATI, 2009) (Royal National Institute of Blind People, 2013) (Action for Blind People, 2013) (American Foundation for the Blind, 2013) These documents have described a wide range of devices ranging from audio input-output (high-tech and low tech), tactile input - output (both digital and non-digital) and adapted visual output (for people with low vision). The audio output devices are tapes and CDs, audio books in standard formats like DAISY, screen reading software which work on a computer and book readers which are usually standalone systems used with OCR scanners. There are also some audio input options like tape and CD recorders and speech synthesisers.

The tactile input devices are modified keyboards which may have Braille cells stuck on a QWERTY keyboard, a Braille keyboard or a high font size, colour contrast keyboard for people with low vision. Tactile output devices are a Braille book / document made using a manual Brailler or Braille embosser and refreshable Braille display which can be used as an attachment to the computer.

Modified visual devices include the magnifying glass, screen magnifying software, large monitors and CCTV. All these devices help to access information in a variety of ways and therefore are very useful for education and work.

The large variety of AT devices makes selection a challenge. Action for Blind People (2013) advises that AT devices be selected by the ‘consider, consult, conclude’ method which requires the selector to consider the type of impairment of the user, consult the user and include him in the decision and then finally conclude by selecting the most appropriate device. Another approach is known as the SETT approach. It has four aspects, namely;
understanding the Student’s abilities and disabilities, Environmental conditions, Tasks to be performed, Tools and strategies to be used. This approach also emphasises the need to consider varying individual requirements and including the user in the process before narrowing on the device to be selected. (WATI, 2009)

3.2.2.1 The use of AT in education

The use of AT for education has been examined by several authors. Ee & Cohen (n.d.) found that there were significant gaps in AT knowledge and skill amongst the teachers, especially in case of high tech AT devices like screen readers. Another research by Grönlund, Lim, & Larsson (2010) which examined the use of AT devices for inclusive education in developing countries, revealed that although developing countries had a reasonable legislation and policies for AT and inclusive education for children with disabilities, they lagged in its implementation owing to factors like lack of funds, co-ordination and networking and identification and use of knowledge and expertise which is important for matching the need and AT device etc. Sandra & Raharinirina (2006) stress the need to select appropriate AT devices and make them available to students with disabilities, according to the type of their disability, the level and severity and its use in education and learning.

Specific devices and their use have also been examined. A study by McCarthy, Pal, Cutrel, & Marballi (2012) analysed the use of screenreaders in India and found that JAWS was the most widely used screen reading software with a high use of the pirated version. NVDA was the next popular screen reading software which had advantages of being an opensource software which could be carried on a USB drive. The study stated that the choice between screen readers could be based on price and support for custom-made applications. However, issues of language support are likely to be of concern as well owing to the fact that India is a multilingual country. Another study by Alves, Monteiro, Rabello, Gasparetto, & Carvalho (2009) indicated that teachers specified the need for infrastructure and pedagogical support in order to
effectively use assistive technology in education of students with visual impairment.

3.2.2.2 Limitations of AT

The literature also reminds us that AT devices do not provide a comprehensive miraculous solution to all the issues of people with disabilities. A study by Johnstone on use of assistive technology by visually impaired students stated that although in theory, assistive technologies are designed to help students fully participate in all grade-level activities, the challenge for students is that these assistive technologies are sometimes unreliable (e.g., not all formats work for internet-based text), take time to learn, and do not always accompany the student beyond the school walls (e.g., many students cannot bring AT devices home to assist with homework). Because of breakdowns in the AT process, students with visual impairments do not always have the same opportunities to learn as their peers with normal vision. (Johnstone, 2009).

Some of the limitations of using AT devices are:

- Using AT devices requires training and practice
- Users and their families are not always included in the selection of AT.
- Needs of the users may keep changing and so do the AT devices, which requires constant upgradation.
- High-tech AT devices are expensive

(Special Education Support Service, n.d.); (Enableall.org, 2013)

It is in the above social and technological contexts that the issues of information needs, behaviour and access and library provision to the visually impaired people were viewed.

3.3 INFORMATION NEEDS AND BEHAVIOUR

Information need studies are carried out by many library and information science professionals as these studies are an instrument to find out more about the different user communities that are served regularly. Hence information
needs is an area where a lot of research has been conducted. Many new studies on information needs add new dimensions to the previous research while others simply reaffirm the findings of the old ones by relating their findings with them.

Faibisoff and Ely (1974) have given a very interesting and descriptive account of concepts, studies and their opinions and findings on information and information needs. They point out the complexity of understanding information need due to the concepts of ‘information wants’ and ‘information demands’ present as its subsets. Information demands are the requirements that are recognised and articulated. They are therefore easy to understand and fulfil. Information wants on the other hand are desires that may or may not be recognised, expressed and fulfilled. Information needs are said to be a combination of both information wants and demands; desires and requirements. (Faibisoff & Ely, 1974)

Susan Tester (1992) defines ‘information need’ as the lack of appropriate information on which to base choices that could lead to benefits or services that may improve people's well-being. It emphasizes the fact that we seldom want - or need - information for information's sake. Information is a means to an end, something that enables us to make choices that may improve our well-being. (Moore, 2000).

Warner studied information needs of urban residents and recognised that persons who were young and had higher levels of education and income were most likely to report problems/questions. He also reported that individuals who were gregarious, who considered themselves opinion leaders on a variety of topics, and who were members of a number of organizations had high frequency of information needs as compared to low profile, introvert individuals who were less likely to report questions or issues. However, this does not indicate that reclusive people have fewer needs, but this may be a result of their acclimatization to their environment of long unmet needs that a conscious effort to identify and express them is not made. The respondents in Warner’s study were not asked to state their information needs, but to identify
the problems they experienced and also how they solved their problems. The data obtained from respondents was coded into fourteen general areas of needs. (Warner, 1973). This study was a benchmark for large scale investigations.

The early information need studies were essentially system studies, rather than person-centred studies. Not only that, they lacked any common theoretical underpinning and were predominantly descriptive and used different methods. (Wilson, 1994). Probably, to obtain some constructive findings and achieve more clarity on this topic, many studies towards the end of the 20th century and the beginning of the 21st century focussed on information needs of specific groups of users or information needs to achieve a common aim or special areas of information needs like ‘everyday information’, ‘health information’, ‘information for citizenship’ etc.

These studies helped to highlight certain information needs which were commonly present irrespective of the user group or objective and also underlined information needs that differed with each new group of users that were studied. This fact reaffirms two of the generalisations made by Faibisoff and Ely (1974):

- The nature and content of information needed is variable and complex, varying from discipline to discipline and from group to group.
- The information needs of the individual change at different stages of his career and with changes in his projects. (Faibisoff & Ely, 1974)

Rita Marcella and Graeme Baxter studied the information needs and information seeking behaviour of national sample of the population in U.K. with special reference to information for citizenship. The study found that over three quarters of respondents would use public libraries and between half and three quarters would approach other sources like, post offices, government departments or family and friends. Face to face communications and reading a book were the most popular means of accessing information were cited. Out of the sample, disabled respondents demonstrated an increased need for
information on welfare benefits citing health reasons for seeking information more frequently and preferred listening to the radio and face to face communication, but were less ready to use computers in libraries, shopping centres, post offices and town halls to access information. (Marcella & Baxter, 1999)

3.3.1 Information Needs and Behaviour of Young People

Since the present study focussed on students, an attempt was made to locate research on information needs of young people. Shenton and Dixon explained that an information need is stimulated by a situation that arises in a person’s life. This information need results in information-seeking behaviour. Information needs take on one of thirteen forms and are closely associated with a more general ‘life aim’ concerned with, for example, alleviating anxiety, making a decision, enveloping a greater understanding, finding out about a subject or solving a problem. The study further adds that even after identifying an information need, the individual may or may not seek to address it. Inaction may result from a youngster determining that the need is insufficiently important for remedial behaviour, although young children, in particular, may simply fail to know how they can respond to satisfy it. The thirteen types of information that may be needed are as follows:

1. Advice;
2. Spontaneous ‘life situation’ information in response to emerging problems and curiosities;
3. Personal information that may relate to the youngsters themselves or others within their social worlds;
4. Affective support;
5. Empathetic understanding of others;
6. Support for skill development;
7. School-related subject information;
8. Interest-driven information;
9. Consumer information to inform decisions regarding the possible purchase of products;
10. Self-development information needed to determine courses of action affecting the youngsters’ futures;
11. Preparatory information pertaining to forthcoming challenges;
12. Reinterpretations and supplementations of information already known to youngsters;
13. Verification information to confirm or deny youngsters’ existing suspicions (Shenton & Dixon, 2003)

In a qualitative study, Agosto and Hughes offered a theoretical and an empirical model of the everyday life information needs of urban teenagers that described the essence of teen everyday life information seeking (ELIS). It stated that ELIS is the gathering and processing of information to facilitate the teen-to-adulthood maturation process. ELIS is self-exploration and world exploration that helps teens understand themselves and the social and physical worlds in which they live. This study aided in understanding the necessity of tying youth information-seeking research to developmental theory in order to examine the reasons why adolescents engage in various information behaviours. (Agosto & Hughes-Hassell, 2006)

3.3.2 Information Needs and Behaviour of People with Disabilities

Most of the studies which dealt with information needs of people with disabilities are on the people with visual impairments, since they constitute the largest category of print disabled people. Nick Moore specifically studied the information needs of visually impaired people for the Royal National Institute for the Blind (RNIB), U.K. and prepared a social information need model. According to the model, social information can be thought of as having six different dimensions, each of which can provide a basis for analysis. They are:

- Function -Why do people need information?
- Form -What kind of information do people need?
- Clusters -What do people need information about?
- Agents -Who initiates the information activity?
- Users -How do needs differ between different groups of people?
• Mechanisms –Which mechanisms can be used to meet information needs? (Moore, 2000)

Moore’s study helped in clarifying the concept of information need for the target group studied.

Another study at the University of Surrey also conducted for RNIB indicated that information about services and support needs to be delivered in as many different formats as possible, i.e. large print, audio, Braille, electronic, as appropriate, as different individuals like to access information in different ways. The study also reported that the information needed needs to be delivered at an appropriate time for a given person as it is unlikely to be absorbed until it is relevant. (SSMR - University of Surrey, 2009).

Duckett and Pratt conducted an interesting research on opinions of visually impaired people on visual impairment research. The findings of their study were even more interesting and revealing. The study found that participants wanted the following topics researched:

• Access to the environment;
• Access to information (including socio-medical issues involved during diagnosis and treatment);
• Attitudes (stigma and its impact on education and employment opportunities);
• Civil rights (problems of collective action and relationship to the disability movement, organisational and political issues including user roles in visual impairment organisations, allocation of resources);
• Support (social and financial).

The study also reported that participants were concerned about the issue of how and if information was disseminated to visually impaired people—both general information (i.e. local news, information on services and consumer products) and more specialist information (i.e. that produced by research and medical practice) (Duckett & Pratt, 2001).
There were a few studies focussed on the information seeking behaviour of visually impaired people, especially in the context of electronic resources and internet. ‘NoVA’ a project to develop understanding of serial searching in non-serial digital library environments, with particular reference to retrieval of information by blind and visually-impaired people was launched around 2001. (Craven, Understanding the searching process for visually impaired users of the Web, 2004)

Williamson and others concluded that people who are blind and sight impaired deserve to be provided with a range of ways of meeting information needs, as are available for people with normal sight. Given the inexorable continuing impact of the information age, alternative ways need to be found and implemented so that people with disabilities can participate equitably in the information economy. (Williamson, Schauder, & Bow, Information seeking by blind and sight impaired citizens: an ecological study, 2000).

Another research examined the ways that visually impaired post secondary students located information for their academic work with a particular focus on assistive technology. The study found the respondents’ information behaviour were constrained by time, a lack of independence, inadequate of human understanding, and limited access to electronic information but were enhanced by assistive technology, support network and the students’ own determination to succeed in the search of relevant information (Saumure & Given, 2002)

Two other studies dealt with disabilities other than visual impairment. Sloper and Beresford studied the information needs of chronically ill or physically disabled children and adolescents. The key findings of the study were that this group of people needed information about not only their medical condition but also about managing their daily living and the extraordinary stress brought by the illness / disability. (Beresford & Sloper, 1999). Another study on information needs of elderly, disabled elderly and non-professional care takers revealed that this group needed information on better practical support for everyday tasks, practical support that is far more accessible when needed and
information on financial help, housing and accommodation options available (Barrett, 2000)

3.4 INFORMATION ACCESS

Several studies take a step beyond looking at information needs and information seeking behaviour, to study information access and related issues.

Information access is a complex phenomenon comprised of multiple aspects with different relationships with each other. McCreadie and Rice reviewed related literature and identified dimensions and their components that had not been considered in other researches. They also presented a framework that provides an initial vocabulary for discussing, analysing, and improving access to information (McCreadie & Rice, Trends in analysing access to information, Part II: Unique and integrating conceptualisations, 1999); (McCreadie & Rice, Trends in analysing access to information, Part I: Cross-disciplinary conceptualisations, 1999)

Borgman’s chapter on access to information gave insight and aided in achieving clarity about the concept of information access, significant factors and related concepts (Borgman, 2003). In a study, Buckland identified six aspects of information access as identification, availability, price to the user, cost to the provider, cognitive access and acceptability of the information received (Buckland, 1991). Lievrouw’s study focussed on ‘universal service’ (a concept related to information access) and provided an important model of the information environment that accounts for the roles of content and conduit, both of which are necessary conditions to achieve true access (Lievrouw, 2000). Oltmann’s paper on information access provides a comprehensive and in-depth literature review. The paper clarifies and summarises key aspects of information access as physical, intellectual and social (Oltmann, 2009). Some studies focussed on specific aspects of information access like the social component or access for specific users like students and people with disabilities.
UNESCO’s ‘information for all’ programme states that information accessibility encompasses the many issues surrounding availability, accessibility and affordability of information, such as multilingualism, metadata, interoperability, open source software, open content, Creative Commons licences as well as addressing the special needs of people with disabilities (UNESCO, 2012). A study on information access for students with disabilities focussed on the state and development of services in Lithuania suggesting steps for improvement (Cypaite, Šerkšniene, & Rudžioniene, 2008). The chapter on ‘access and accessibility’ in Jaeger and Bowman’s book on ‘Understanding Disability’ provides an exhaustive description of physical, intellectual and social access highlighting the importance of the social aspect in the context of access to information for people with disabilities and its relation with the other two aspects (Jaeger & Bowman, Access and Accessibility, 2005). Another study by Jaeger with other authors also emphasises the relation between normative behaviour and information and the social aspects of information access (Burnett, Jaeger, & Thompson, 2008).

While most studies focused on access to information, one study looked at accessibility from the availability point of view and considered the use of information sources at a university library. The study revealed that use of information resources is affected by physical availability and accessibility. Availability was affected by poor acquisition and slow processing of resources while accessibility was reported to be affected by poor indexing and cataloguing, inefficient loan and circulation system, poor shelving, and lack of adequate guides to library arrangements, as well as administrative and physical barriers, lack of adequate hardware to access the information sources in non-print media and in electronic forms (Ugah, 2008).

3.5 WEB ACCESSIBILITY

Web accessibility is about people being able to get and use web content. Studies have shown that there is a lot of variance in the accessibility of different websites. Government websites, websites of organisations in the field of web development and information technology should have ideally had
accessible websites; but their evaluations indicated that they were not accessible. There was also a difference between accessibility of websites from different countries. Web accessibility of websites decreased with time probably owing to the negligence of the issue in web design renewal and introduction of new complicated format of web site design (Hong, Katerattanaku, Choi, Kang, & Cho, 2007) and (Lazar, Beere, Dawn Greenidge, & Nagappa, 2003).

A primary focus of accessibility is access by people with disabilities (Henry, 2006). Unfortunately, the scenario is not as it should be especially in case of people with disabilities. Web accessibility means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web. Web accessibility encompasses all disabilities that affect access to the Web, including visual, auditory, and physical, speech, cognitive, and neurological disabilities. (World Wide Web Consortium - Web Accessibility Initiative, 2012) Research has confirmed that people with disabilities are most at risk of being excluded from access, and in particular people who are blind or visually impaired (Brophy & Craven, 2007)

3.5.1 Web Accessibility Issues

Several researches address the problem of web accessibility with the aim of understanding the issues faced by different groups of people and people with different disabilities, examining the accessibility of websites belonging to a particular group such as government departments, colleges and universities etc, and suggesting new methods to overcome barriers.

Basically, people with visual impairments face problems accessing information on the web due to some inherent properties of Web applications which have emerged through continuous advancements of the technology. These properties largely determine the usability and effectiveness of Web based applications to different categories of audiences. Baguma and others identified four main properties which affect accessibility for people with visual impairments. These are:
• Non-linear access – information is structured in multiple layers (hypertext) hence access is link based and nonlinear
• Lack of control over end user access behaviour and environment – since web designers cannot know the exact computer equipment that potential users have, or what fonts and software have been installed in the users' computers (relevant in case of people using assistive technology), they have no control over how the pages namely: the fonts and colours will appear on a page, and the size, proportions and exact locations of the different Web texts in the client end user agent.
• Heavy dependence on visual cues for input and output (Graphical user interface (GUI) based) poses a significant problem for users with visual disabilities. Continuous advances in Web technology have made it more multimedia oriented to include video, flash, motion pictures and images. While ideally this is good for enhanced communication, certain media formats are unusable to Web users with disabilities even with assistive technologies.
• Most developers are young and have perfect vision and who often assume that all users have perfect vision and motor control and know everything about the Web. (Baguma, Bommel, Wanyama, & Patrick, 2007)

Studies on access to web information by visually impaired users revealed that they have to spend more time navigating around each page, especially if, for example, the page contains a lot of information or has many links. People with more experience with their assistive technology were more successful with the task (Craven, Access to electronic resources by visually impaired people, 2003).

Although there is a growing awareness about web accessibility, there are still some misunderstandings and myths prevalent about it which hinders the pace of eradicating Web accessibility barriers. Brewer lists some of these as:
• Assistive technology can make / convert all Web sites in to accessible sites
- WCAG 1.0 is a stand-alone solution – WCAG is all that is needed to ensure an effective user experience.

Both these misunderstandings lead to failure in looking at the necessary complementary roles of technology designers, browser and media player developers, authoring tool developers, and content developers in ensuring an accessible experience for the end user. The chief misconception is that text-only Web sites are a sufficient solution for accessibility, or that accessible Web sites are necessarily dull and boring. While text-only Web sites may work for people with certain types of visual impairment, they are not an effective solution for people with auditory, mobility, cognitive or neurological impairments, or even for people with many types of visual impairments. For instance, many people with low vision might rely on images, enlarged by screen magnifiers, to help them focus in on content on a Web site. (Brewer, 2004)

The barriers to access identified by a study appeared to come about by lack of knowledge and thought by the page designers themselves. By adhering to simple guidelines, visually impaired users would be able to access information more effectively than would otherwise be possible. (Oppenheim & Selby, 1999).

A study evaluated web accessibility in higher education confirmed that only few websites were totally accessible and a continued effort to educate administrators, faculty and web designers about the need for web accessibility is essential. (Thompson, Burgstahler, & Comden, 2003) Another study evaluating school websites found 84% of web sites had at least one Priority 1 error. The major sources of these errors were related to text equivalents (Alt tags) for images. Issues related to font sizes, screen resolutions, contrast, style sheets, and flickers were also found (Wells, 2006). Avenues for improving accessibility awareness among computer science and information systems students and additionally developing and accessing developer competence in accessibility have been proposed. (Bundrick, Goette, Humphries, & Young, 2006).
Axel Schmetzke conducted a study to look at the web accessibility of highly ranked university libraries and library schools (in USA) that revealed low web accessibility. It is a cause of concern that institutes training future librarians were unaware of these issues. (Schmetzke, 2001). Michael Providenti who evaluated library Web accessibility at Kentucky's 4-year degree granting colleges and universities also noticed low levels of compliance with Web accessibility guidelines (Providenti, 2004). Paul Jaeger emphasised that even beyond the need to comply with the laws to avoid claims of discrimination or lawsuits, libraries should be working to have fully accessible electronic and information technology because libraries are intended to provide information to all, not just the non-disabled. Accessible websites will produce numerous benefits to the library, from community goodwill to increased patronage to compliance (Jaeger P., 2002). The responsibility of libraries in providing accessible websites was also confirmed by Golub & Lazic who tested sixteen Croatian public library websites for accessibility (Golub & Lazić, Accessibility of public library Web sites, 2002) and Brophy & Craven who add that there is substantial progress in the awareness of libraries about the issue of Web accessibility (Brophy & Craven, 2007).

Some researches focus on the probable solutions rather than pointing out the problems. A research on the ‘travails of visually impaired web travellers’ introduced the notion of travel into web design and usability metrics. Travel in the virtual, web world to that in the real, physical world has been related to evaluate web pages. Travel objects identified were e.g. hyperlink menu is a landmark that acts as both a way point and a memory object designed into the web page, a back button is a way point provided by the browser etc, thus, proposing the inclusion of travel and mobility in the usability metrics of web design which would assist in the design of better user agents and web content for visually impaired and other users. (Goble, Harper, & Stevens, 2000). John Richards and Vicki Hanson took a broader view of web accessibility by designing and introducing low cost software that improves readability, reduces distraction, and filters noisy keyboard input with software running with browsers for people with visual and motor impairments. (Richards & Hanson, 2004). Thus, with varying problem identifying methods and varying issues
there are also a variety of solutions offered. The feasibility of these solutions should be checked and then put to use by people who want to solve the web accessibility issue.

### 3.5.2 Evaluation Tools and Techniques

Web accessibility evaluation is a widely studied area by many researchers with active developments in the fields of evaluation techniques and tools. Web accessibility can be evaluated by means of different methods, like standards review, user testing, subjective assessments and barrier walkthrough etc with types and sub types of each. Conformance reviews, also called expert, standards, or guidelines review, is the most widely used method. Conformance reviews are dependent on the chosen checklist, that range from standards issued by international bodies (like the Web Content Accessibility Guidelines, WCAG, published by the W3C), to national or state-level guidelines, to individual organizations guidelines (like those issued by IBM, SUN or SAP, for example). Other methods for evaluating accessibility include screening techniques, informal empirical techniques based on using an interface in a way that some sensory, motor or cognitive capabilities of the user are artificially reduced; subjective assessments, based on a panel of users instructed to explore and use a given website by themselves, and later report feedback on what worked for them and what did not. The barrier walkthrough (Brajnik, 2006) method is an accessibility inspection technique where context of website usage is explicitly considered. An evaluator assesses a number of predefined barriers which are interpretations and extensions of well known accessibility principles; that are linked to user characteristics, user activities, and situation patterns so that appropriate conclusions about user effectiveness, productivity, satisfaction and safety can be drawn and appropriate severity scores can be consequently derived. (Brajnik, A comparative test of web accessibility evaluation methods, 2008)

In addition to these methods, here are a variety of automated tools (software) available (Ivory & Chevalier, 2002) that are based on techniques like conformance guideline violations, simulation as per different disabilities,
special screening to aid web designers, available as evaluation tools. The automated tools are often used in combination with some other technique to provide a holistic understanding of accessibility. Any technique or tool chosen to evaluate Web site accessibility should be ideally coupled with inputs from users and also considering the assistive technology likely to be used. Although gathering inputs from users is a time and cost consuming task, many studies have followed the pattern of considering user opinions. (Disability Rights Commission and British Standards Instituion, 2006)

There have been researches introducing innovative evaluation tools and techniques that aid in assessing the Web accessibility. A research on accessibility evaluation using simulation developed a tool called EASE (Evaluating Accessibility through Simulation of User Experience), a tool that can help developers identify disability-related usability problems early in the design process. It can also be used to allow fine-grained exploration of user capabilities that are difficult to control, such as achievable typing speed. (Mankoff, Fait, & Juang, 2005) Xiaoming Zeng used a novel approach called as ‘Web Accessibility Barrier Score’ to compare website accessibility normatively and also evaluated the usability using a usability of websites before and after being transformed by the ‘Web accessibility transcoder server’. (Zeng, 2004). A combined approach, that of manual verification and automatic validation, and an examination of the aesthetic appeal of five protection & advocacy Web sites was used by Daphne J. Childres. (Childres, 2007). Evaluation of websites therefore is a well researched area that has several ongoing projects.

3.6 LIBRARY ACCESS AND SERVICES FOR PEOPLE WITH DISABILITIES

Literature on library services to people with disabilities covered topics like importance of inclusive library services, aspects of inclusive services such as eradication of physical barriers, conversion of material into required accessible formats. The significance of trained and sensitised staff towards the issue of serving people with disabilities was also highlighted by many studies.
A white paper by Barrier Break Technologies on inclusive libraries mentioned that as libraries are a vast source of information with collections in varied formats and sources, persons with disabilities should have access to both physical and digital libraries as their right. The paper also stated that inclusive libraries can be turned into a reality only by making resources accessible, ensuring easy physical access and providing good services and communication to the users. (Barrier Break Technologies, 2013)

A study focusing on library services for people with disabilities in Japan identified barriers which made libraries and their service inaccessible. It suggested that these barriers should be considered to be the problems of the libraries and not those of the users, which actually prevent people from using their services. The study emphasised that library services should be provided with reasonable accommodation for people who have difficulties in using them. (Nomura, 2004).

On similar lines, Epp’s study reported that only 5% of the world’s publishing output is made accessible in alternate formats for people who cannot use print. The study advocated that to provide equitable access to information and library services; libraries need strategic partnerships, improved public policy, and international agreements to fulfil the promise. The study also stated that although equity laws, union catalogues, new technology, standards for production and resource sharing, postal subsidies, and commercial production of alternate formats have proved helpful, some challenges like attitudes, organizational isolation, diversity of alternate formats, non adherence to standards, inaccessible online services, an uncooperative publishing industry, inconsistent access to equipment, and inadequate training still remain to be overcome. (Epp, 2006). With related suggestions on accessible library services, Carter added that equitable access is a concept that benefits not only those students with disabilities but those without disabilities as well. (Carter, 2004)

As libraries expand their services, online services form a major area of providing convenient services to users. People with disabilities are often
excluded from these services. Williamson and his colleagues studied the role of internet for information access in libraries for people with disabilities. They suggested that one of the key strategies for improving access to the internet in public libraries for people with disabilities is for librarians to seek the support of community groups. The development of partnerships with local disability groups, particularly to assist with internet training, is likely to result in significant benefits for libraries and users as well (Williamson, Schauder, Stockfield, Wright, & Bow, 2000). The study by Courtney Denies-Jones suggested that although assistive technology adds convenience to the use of information and library services, especially through internet, it must be purchased on actual patron needs. When assistive equipment is not available, libraries must develop other approaches and must be willing to provide additional help to patrons. Keeping abreast of advances in access technology and strategies to offer better services to people with disabilities was also stated as an essential factor (Deines-Jones, 1995)

In addition to the studies suggesting the importance and methods to accessible libraries and library services, several studies also examined the actual status of library services offered to people with disabilities by some specific library or group of libraries.

A research to determine the status of the library services for visually impaired and physically handicapped people in Argentina reported that libraries were not in a position to provide the best library services for visually impaired and physically handicapped individuals. It suggested that an integrated library approach based on the UNESCO manifesto 1994 for public libraries should be put in action as it would effectively ensure access to information for visually impaired and physically handicapped people, and ensure “a public library for everyone”. (Todaro, 2005) Another survey of academic health sciences libraries serving the needs of people with disabilities reported that nearly three-quarters of responding libraries had eliminated physical barriers. Services like retrieval of materials from the stacks and photocopy assistance were most common. The survey also reported that much less attention had been paid to the use of adaptive technology that allows disabled users to
search a library's online catalogue and databases; special technology is often provided by another unit on campus but there seems to be little coordination with library services. Only a few libraries had assigned responsibility for disability services to a specific staff member and even fewer have done a formal assessment of the need for special services (Nelson, 1996).

A study examining the provision in U.K. by Higher Education (HE) library services for students with disabilities within the context of the disability legislation in ‘The Special Educational Needs and Disability Act 2001’ (SENDA), found that on the positive side, all libraries had a disability representative and many staff attended disability awareness training. However, problems of accessibility of the built environment such as improper lighting, inappropriate shelves and signage, were unresolved (Heaven, 2004).

Lee explained that since it is almost impossible for people with disabilities to use general libraries conveniently as they have physical, psychological barriers in addition to the inaccessible library materials, the National Library Support Centre for the Disabled was established to take appropriate actions to solve existing disability discrimination and close the digital divide. (Lee, 2007)

3.6.1 Library Access and Services for Visually Impaired

The literature also revealed information about special libraries for people with visual impairment. The studies focused on the role of libraries for people with visual impairment, significant factors affecting these libraries and services offered.

Kinnell and others highlighted the importance of having a clear policy statement, budgetary provision, staff training, partnership between libraries, service evaluation, materials provision with a selection strategy, equipment procurement in public libraries to better serve people with visual impairment (Kinnell, Yu, & Creaser, 2000). A literature review paper on ‘Library Services for Blind and Visually Impaired People’ emphasised that libraries specializing in services for the visually impaired need to modify their role from suppliers
of special format resources into information professionals focusing more on content; these libraries need to promote digital standards and special initiatives for the use and the easy access to electronic resources (Bernardi, n.d.).

The study by Margaret Kinell Evans reported the major role played by the voluntary sector in service provision to people with visual impairment. The study also identified fragmentation of resources across various uncoordinated organisations, unwitting exclusion of a large proportion of visually impaired people from library and information provision, and segregation of the sighted and visually impaired people by public and academic libraries as factors affecting library services to people with visual impairment (Kinnell Evans, 2000). A Korean study reported that Braille libraries in Korea traditionally provided information access and services to visually impaired users through Braille and talking books. These libraries have also adapted well to the technology enhancements and now provide services using the internet and make their web pages accessible. Web page accessibility is also followed by many other general libraries. (Kim, 2005).

Golub investigated library accessibility in Croatia. The investigation revealed that libraries in Croatia need to develop substantially in terms of services for people with visual impairment. Although the libraries offer their general services to all, providing library materials in accessible formats such as digital, audio, large print and Braille, developing electronic library catalogues of these materials on the World Wide Web, ensuring on-site workstations equipped for the blind as well as developing other library services are the areas where development is required (Golub, Digital libraries and the blind and visually impaired, 2002). Another study which examined special services for the blind and visually impaired by public libraries of Mazandaran province found that the rate of users' satisfaction of access to existing resources in the studied libraries was low. The study also reported low user satisfaction in terms of facilities and equipments provided. Users were a little satisfied about the library working hours and the library staff's skills in providing special information services for them, except use of Braille books (Kharamin & Siamian, 2011)
Analogous to the studies of library services for people with disabilities using the internet, a survey of blind and partially sighted people who have some experience of using electronic information services found that libraries were out of touch with user needs relating to electronic information services, that there is correlation between user’s personal preferences and the usability of services, and that diverse and varying services act as a barrier to use. The study also reported evidence that the computer access technologies aimed at blind and visually impaired people may not be well used in libraries, without significant investment in staff training (Lewis, 2004).

There are some unique projects and strategies that aim to advance library services for people with visual impairment. Kavanagh and Freeze describe one of them, VISUNET. It is a project on virtual library service for visually impaired people blends the unique features of libraries for the blind with the Internet, mainstream library services, other commercial databases and private sector partners to ensure best content (Kavanagh & Freeze, 1997).

### 3.6.2 Indian Studies

As compared to the research conducted on library access and library services for people with disabilities and specifically people with visual impairment, in different countries, very little research in India focuses on the issue.

One of the key research identified was that conducted by Dr. Priya Pillai (2012) titled ‘Library and information services for the visually impaired in India’. The study identified and examined the institutions providing library and information services to visually impaired people in India with reference to their infrastructure, library materials, IT facilities and services. The study also examined disability acts and copyright laws for the visually impaired in USA, U. K and India. The study further looked at the needs and expectations of the visually impaired library users and suggested ways and means to improve the library facilities (Pillai, 2013).
A paper discussing the need of digital libraries for blind users in India suggested that the development at national level should be initiated so that this special category of users are not deprived of library services in this information age. The study suggested certain policies that should be incorporated in the strategy of the library ensuring that library services to blind and print handicapped people should be of the same quality as that to common people, and special format materials should be treated on equal terms with all other materials (Bhardwaj, Shukla, & Kamboj, 2005). Singh and Moirangthem also suggested the need for increased efforts to the still very insufficient library services and fill up the lacunae in providing information services to the visually impaired people. (Singh & Moirangthem, 2010). Another paper describing the case of M.K. Tata Memorial Learning Centre (TISS) recounted the facilities and services provided by the centre to visually impaired students studying at TISS (Koganuramath & Choukimath, 2009)
References


Department of Basic Education. (2013). *Inclusive Education*. Retrieved June 30, 2013, from Department of Basic Education: Republic of South Africa:


http://www.gnb.ca/0000/publications/Definition%20of%20inclusion.pdf


http://www.google.co.in/url?sa=t&rct=j&q=Survey%3A%2BAssistive


Chapter 3  

Literature Review

http://www.codeproject.com/Articles/9584/The-secret-benefit-of-accessibility-Part-1-Increas


http://ssa.nic.in/page_portletlinks?foldername=inclusive-education


http://plato.stanford.edu/entries/disability/

http://www.wati.org/content/supports/free/pdf/Ch12-Vision.pdf


http://www.who.int/mediacentre/factsheets/fs282/en/


