



# Creating an Effective Learning Environment for Visually Impaired Students: Assessing their Perception of Audio Books

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## Abstract

Education for the visually impaired is made available through the medium of sound and touch. In India educational resources for visually impaired are not many and most of the available materials are not actually accessible to them. The vast majority of visually impaired students are thus excluded from the mainstream. With a view of helping the visually impaired students have access to knowledge and information, a project was undertaken by the National Council of Educational Research and Training (NCERT). The intention was to make the textbooks accessible to these students and by converting the printed textbooks into audio books. Some organisations working in this area in India have already converted textbooks including NCERT textbooks for higher classes from IX to XII, while textbooks in Braille are available for all classes. Since audio books were not available for the Upper Primary classes, conversion of the NCERT textbooks for classes VI-VIII into audio books, was taken up for enhancing the learning abilities of the visually impaired students which can be used along with the books in Braille. Because audio books for this stage were developed for the first time and unlike other audio books these are providing explanation of selected visuals and providing navigational facility, it was felt necessary to try out these audio books before finalisation with its actual users. An effort was made in this try out study to investigate the perception of visually impaired students of these audio books.

**Keywords:** Visually impaired, audio books, assistive technology, persons with disabilities.

## Introduction

As mentioned by Kurubacak and Yuzer, “integrating novel technologies and their new capacities to increase educational productivity by considering individual differences...are a paramount essential phenomena in effective learning”<sup>1</sup>. Nowadays new technologies are being used in education to provide opportunities to people from different environments, age groups and abilities. The need to incorporate assistive technologies (AT) within educational programmes for visually impaired children is unequivocally recognized<sup>2,3,4</sup>. The emerging communication technology provides these children an equal opportunity where they can schedule their own pace and capacity for education<sup>5</sup>. Some of the assistive technologies which visually impaired children use consist both hardware and software products including screen readers, screen magnifiers, closed-circuit televisions, electronic magnifiers, scanners and optical character readers, portable and refreshable Braille displays, digital and electronic data, digital readers, and accessible cell phones<sup>4</sup>. Indeed, developing assistive technologies offer varied opportunities with regard to “sound”. The available literature on learning through listening establishes that listening rate significantly exceeds reading rate for both braille and print readers with visual impairments<sup>6</sup>.

The conversion of the printed books and into the audio books and provides one such opportunity concerning 'sound'. Since the audio books in digital format provide an easy access, low cost

and swift navigation of the content it enables the students to study faster by going back and forth while covering the contents of the audio book. Indeed, students can study at any time of their choice without other people's help; stop and start the audio whenever they need; replay a passage as many times as they want; and skip over any material they do not need<sup>1</sup>. and Students can use and audio books along with braille books as well as for individual learning. These audio books can be used to complement with internet and computer-based learning and their practices also. Since the addition of audio to visual reading experience expands options and flexibility for all, audio books are not only of greatest benefit to visually impaired people but these can be of great use to the general population as well<sup>6</sup>.

**Indian scenario:** Access to information is major problem for the disabled in India. The visually impaired in India till today depend mainly on two primary sources for their information, one is Braille Books and the other is talking book service. However, these too are not easily available and thus leaving vast majority of visually impaired out of the mainstream schools. The government of India has tried to provide support to the persons with disabilities and by enacting and special Acts like 'Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act', which is an important landmark towards ensuring equal opportunities for people with disabilities and their full participation in the nation building<sup>7</sup>. The government has also executed and 'National Policy for Persons with Disabilities' and which recognizes persons with

disabilities as valuable human resource for the country and thus seeks to create an environment that provides them equal opportunities, protection of their rights and full participation in society<sup>8</sup>. In its 'Action Plan for Inclusive Education of Children and Youth with Disabilities' the Department of Education, Ministry of Human Resource Development emphasized its goal as "Recognizing Education for All children as a fundamental right, to ensure the inclusion of children and youth with disabilities in all available mainstream educational settings, by providing them with a learning environment that is available, accessible, affordable and appropriate to help develop their learning and abilities"<sup>9</sup>. On 30th June, 2014 India ratified historic Marrakesh Treaty to facilitate access to published works for persons who are blind, visually impaired, or otherwise print disabled. The Marrakesh Treaty requires its contracting parties to adopt national law provisions that permit the reproduction, distribution and making available of published works in accessible formats to VIPs and to permit exchange of these works across borders by organizations that serve those beneficiaries<sup>10</sup>. It further escalates government's effort towards establishing equal rights and opportunities for education and employment for and persons who are blind, visually impaired, or otherwise print disabled.

Today information and communication technology (ICT) is helping a lot to reduce the digital divide between sighted and the visually impaired. Indeed, ICT can revolutionize the way visually impaired read and write and help in making them totally independent. Since ICT and its tools are very flexible it provide great scope for usage by persons with visual impairment. National Focus Group on Education of children with special needs and focusses on utilising technology and assistive devices, which are accessible, affordable and appropriate, to support children with special needs for developing their learning and abilities<sup>11</sup>. Guided by the National Policy on ICT in School Education 2012, the recent ICT curriculum for schools also advocates providing additional support to physically challenged, particularly the visually impaired and the auditorily impaired in the form of digital information and resources. Along with creating, sharing and curating a plethora of resources for students and teachers it clearly mentions providing disability and assistive technologies like screen readers, audio books and talking books for the visually impaired<sup>12</sup>.

**Need assessment of visually impaired:** A preliminary research was carried out at some government and private institutions and schools of Delhi and outside Delhi to and identify the needs of visually impaired students at upper primary stage. In these visits and interactions were held with students as well as with teachers to find out the and materials available to visually impaired students studying social science particularly History at upper primary stage, the problems they face in these materials and other related issues. Following are the major observations made and by the researcher during the preliminary research: i. At upper primary stage, other than braille books visually impaired

don't have any other material. At secondary and higher secondary stage, they have braille books as well as audio books. ii. The braille books available to visually impaired are in two formats-contractions and open. Most of the students find difficulty in understanding contracted books. The main problem that they face in their braille books is that these books and don't explain visuals or other source excerpts. So they have absolutely no idea of the kind of visuals used as important source material in the present history textbooks. And Sometimes there are spelling mistakes also while some other time the pagination is wrong in the braille books. iii. Most of the students and responded that their parents help them in their study by arranging tutors for them and sometimes their elder brother or sister read stories for them. Other than this, they don't get any help. iv. When asked about an idea of introducing audio and books and at upper primary stage they all welcomed this idea. They suggested to have explanation of visuals in the and books (the audio and books and prepared for and higher classes are simple conversion of text into audio). But at the same time they also showed their concern about the availability of computers or players required for playing audio books.

The researcher found that some organisations have already converted textbooks including NCERT textbooks into audio for higher classes from IX to XII, while textbooks in braille are available for all classes.

**Preparation of audio books:** So as a follow up of this need analysis NCERT History textbooks of upper primary stage were converted and into audio format with an aim to enhance the learning abilities of the visually impaired students (including students with low vision and dyslexia) along with the use of braille books. Since these textbooks were not prepared keeping in mind the visually impaired particularly, these were first edited for their language to make the language of these textbooks sensitive to them. The history textbooks contain lots of visuals, instructions, activities and projects<sup>13,14,15</sup>. While editing, appropriate changes were made. For example words like 'look', 'see' were generally replaced with words like 'find', 'discuss', 'hear', as per the context. Sentence like '*You have seen (Chapter 2) how the English East India Company's interest in trade led to occupation of territory...*' was changed to '*You have already heard in chapter 2 how the English East India Company's interest in trade led to occupation of territory...*'. In the same way questions like the one which reads '*Look at the table on page no.25. If Neinuo wanted to eat rice, which are the places she should have visited?*' and was modified to '*Listen to the table given on page no.25 once again. If Neinuo wanted to eat rice, which are the places she should have visited?*' An activity '*You are sitting in a mandapa of a temple. Describe the scene around you*' was changed to '*You are sitting in a mandapa of a temple. Describe what you hear.*' So such modifications were done both in English and Hindi versions of textbooks. While editing, a few visuals were also selected from textbooks and their explanations were prepared with some questions on these to make students comprehend these visuals better. For

example a visual (Figure 1) on a monument of Warren Hastings was explained as -

There are three figures shown in this visual. The majestic figure of Hastings is placed on a high pedestal between the standing figure of a pandit on one side and a seated munshi on the other side. *Why do you think the sculptor has positioned the figure of Hastings on a high pedestal than the other two?*



**Figure 1**  
**Monument to Warren Hastings<sup>15</sup>**

Through explanation of visuals students are given a chance to understand the historical reality on their own. After editing and explaining a few visuals the text was converted into audio. With the application of appropriate software, it also allow the visually impaired students to go to a previous chapter or more ahead, to even go to specific line or paragraph.

**Purpose of the study:** Since audio and books for this stage were developed for the first time and were provided with navigational facility, the present study was taken up to assess the effectiveness of audio books as an educational tool by trying it out with visually impaired students. To attain that purpose, the opinions of the students were gathered on the following issues: i. use of any audio books prior to NCERT's audio books, ii. types of learning opportunities available to students, iii. understanding the effect of the audio books on the studying and learning of the students, iv. enefits and drawbacks of and audio books with regards to the learning environment, v. problems faced and in finding the chapters in the audio books, vi. comprehensibility of the verbal explanations of the illustrations in the audio books, vii. views on whether the audio books should be made for other subjects or not

**Limitations:** This study was limited to 45 students studying in different government and private schools of Delhi and also limited to the audio books prepared for only History subject.

**Educational implications of the study:** This study will and help the visually impaired students benefit from the audio and

books more effectively and fruitfully and produce audio books of better quality.

**Background notes on the audio books:** The audiob books under study were prepared and based on NCERT's History textbooks for classes VI, VII and VIII (*Our Pasts I, Our Pasts II, Our Pasts III, Parts I and II*) both in English and Hindi. These textbooks cover ancient, medieval and modern periods of Indian history. These textbooks have been prepared in such a way that these help students in developing a historical sensibility and awareness of the significance of history. An effort has been made at this stage to encourage students to see history not simply as a set of facts about the past – economic, social, political, and cultural – but that they need to learn to think historically<sup>16</sup>. These textbooks have been prepared keeping in mind the broad themes from different periods and have a lot of visuals, source excerpts and maps as important source materials along with questions on them.

The audiob books consist of chapters. Every chapter is like an independent module in the audio books. The books are approximately of 10 to 12 chapters, and each of these books are around 130-150 pages long. The books have been recorded as a direct lecture by a single narrator. These audio books can be played on DAISY players as well as on computers. To use these books on computer students are required to first download freely available software's like AMIS, FS READER etc. and then they can listen to these books.

## Research Methodology

This study in which qualitative research method is used, is aimed to investigate how students benefit from the audio books. Open-ended interview technique was used to gather data. The interviews were conducted on each participant without reconstructing the questions, following the same order for all participants. Participants were not provided with any guidance but they were given freedom to answer the questions as they wish, without any word limitation<sup>1</sup>.

The study was carried out on the visually impaired students at National Association for the Blind (NAB), New Delhi. NAB is a non-profit organization which is working towards making visually impaired and persons self-reliant and contributing members of the society. It advocates the concept of integrated education and tries to embed and assistive technology into the lives of every visually impaired and thus helps in bringing them closer to the world. The scope of the study consists of 45 visually impaired students (including students with low vision and dyslexia) studying in classes VI-VIII in government as well as private schools of Delhi. Sample of the study consists of 5 students randomly chosen out of the 45 students.

The audio books and were handed over to students individually and were given one week time to listen to the audio books. The instrument used in this try-out was face-to-face interviews. In

order to confirm the reliability of the questions field experts were consulted for preparing questions to be asked to gather data. The and try-out was carried out during August -September 2013. All interviews were recorded by the researcher herself. Systematic random sampling was employed to select students for the study. All of the obtained data was analyzed considering the responses of the participants to the addressed questions. The responses of each individual were separated and then they were grouped for each question and the main themes were determined according to their responses<sup>17</sup>.

## Results and Discussion

Questions were prepared to ascertain how the visually impaired students and perceive the audio books. Qualitative analysis method was used to analyse the data reserving the order of the questions as they are.

The students were asked about the use of any audio books prior to NCERT's audio books. Participants did not state about benefitting from any audio and books prior to the audio books prepared by NCERT. The reason for this is that the available materials for the visually impaired students are not many and the materials which are available are mostly in Braille. Therefore, the audio books and prepared by NCERT were considered to be innovative and helpful in creating a different learning environment for students.

Most of the visually impaired students participating in the study reported taking help from a volunteer reader (usually relatives of the visually impaired students).and These and students are often required to schedule their studying time as per the availability and convenience of volunteer readers. The other students in the study reported that they use and braille books.

Almost all of the students stated that the learning of their school subjects will improve with and these audio books and These audio books make students more independent and give them an opportunity to learn on their own by scheduling their studying as they wish. Moreover, students can relisten to the chapters in the audio books that s/he could not understand or that s/he considers as to be important. This relistening will provide an opportunity to visually impaired students to understand the given content on their own pace.

The students were asked about the benefits and drawbacks of the audio books with regards to the learning environment. It was found that they usually take help from a volunteer reader but with audio books they did not require anybody's help in their studying. Audio books gave them an option to study individually wherever and whenever they wished, without any time constraint and disturbance. Likewise, the students with limited eye problems stated that and these audio books helped them in studying without using any magnifying glasses and tiring their eyes.

The students did not face any problem in finding the chapters that they needed in the audio and books. The organization of audio books into and chapters helped students in finding the content that they needed.

About the degree of the comprehensibility of the illustrations, majority of the participants, considered the explanation of illustrations as understandable in the audio books. All participants showed enthusiasm about and the audio books and wanted similar audio books for other subjects as well.

## Conclusion

This study sought to find out how audio books are perceived by the visually impaired students. The findings suggest that the visually impaired students of upper primary stage used audio books for the first time. These audio books gave them an and option to study individually whenever and wherever they wanted and without help from any volunteer reader and thus provided the visually impaired with new and different learning environments and opportunities. However, the number of and students having CD player or computer at home or in their schools or organisations where they reside is limited. So these difficulties should also be kept and in mind and while making available such materials to these students. Newer ways should be adopted to make these audio books with inbuilt players and also make them available on websites besides in audio book format to facilitate access for more students. While updating the books, there is need to revise and update audio books also. The audio books produced by NCERT, follow printed textbooks in its content and coverage, however, students demanded shorter versions also which include summary.

**Scope for further research:** The findings do not reflect the change brought in by the use of these audio books and in the understanding of visually impaired students but it does give an idea of the perception of students about these books , which are not only in the audio form but also provide navigational facility to them and also try to explain a few visuals to them. In future, when these audio books are in circulation for some time among students further research can be taken up to see whether the student is making any improvement in her/his performance with the new independent reading methodology or not or to what extent and he/she has grasped the subject.

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