
A Study on Reading and Learning Needs of Visually Impaired, Solutions Available and our Approach forward

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Abstract

In this paper, the need and current scenario of inclusive solutions for reading and learning for the print disabled is discussed. The key-findings derived after extensive user-engagement working closely with them through extensive on-field research covering over 200 people across 8 cities in India while and capturing their inputs through interviews and about 100 hours of audio/video recordings to monitor and understand user behavior in their natural surroundings is described in the paper.

Author Keywords

inclusion; accessibility; visual impairment; reading habits;

Introduction

253 million visually-impaired people worldwide are dependent primarily on Braille, Audio-books, Screen readers and magnifiers for accessing academic, work-related or leisure-reading content. 700 million people suffering from learning disabilities like dyslexia risk their lives with life-long illiteracy and social-exclusion.

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Audio-books are not updated on regular-basis. Regional-language learning resources are not always available in accessible format. Braille and Audio-book delivery takes weeks-to-months. Availability of content is restricted to domains such as humanities and commerce which limits the scope of aspiring for unconventional careers.

Print Disabled students rely on teachers/peers/parents for reading, recording and making notes, which introduces dependency and delays accessibility. Audio-recording in classroom-teaching has environmental noises, rendering poor audio-quality. Lack of self-assessment tools in schools lowers student-confidence leading to 50% drop-outs after 10th standard. Braille and Audio-books deliver a very linear reading-experience vs what visually-abled people experience as diffused learners.

Current Scenario

The reading/learning content is classified into 3 major categories: Machine Readable, Non-Machine Readable and Printed/Handwritten Texts. An assessment of existing tools for content accessibility leads us to the following segregation according to the content type:

After understanding the types of reading content existing in the environment through the users and the present solutions available were categorized into 6 sections:

- 1) Digital Text with Unicode based fonts (Machine Readable)- EBook reading software and apps are used with Text to Speech Engines. Formats like EPUB are widely used.
- 2) Digital Text with Non Unicode fonts (Non-Machine Readable)- Font Converting tools are used; requiring for which specialized skill-training is required
- 3) Printed Text- Magnifiers for low vision, Scanning and OCR solutions

- 4) Audio Content - Audio Books in DAISY and MP3 are used
- 5) Braille Content- Solutions like reading and writing tools, Refreshable Braille Displays, Braille printers, Braille tablets are available

- 6) Handwritten Text- People with low vision use magnifiers while and people with severe vision impairment need to rely on the interpretation of visually abled peers

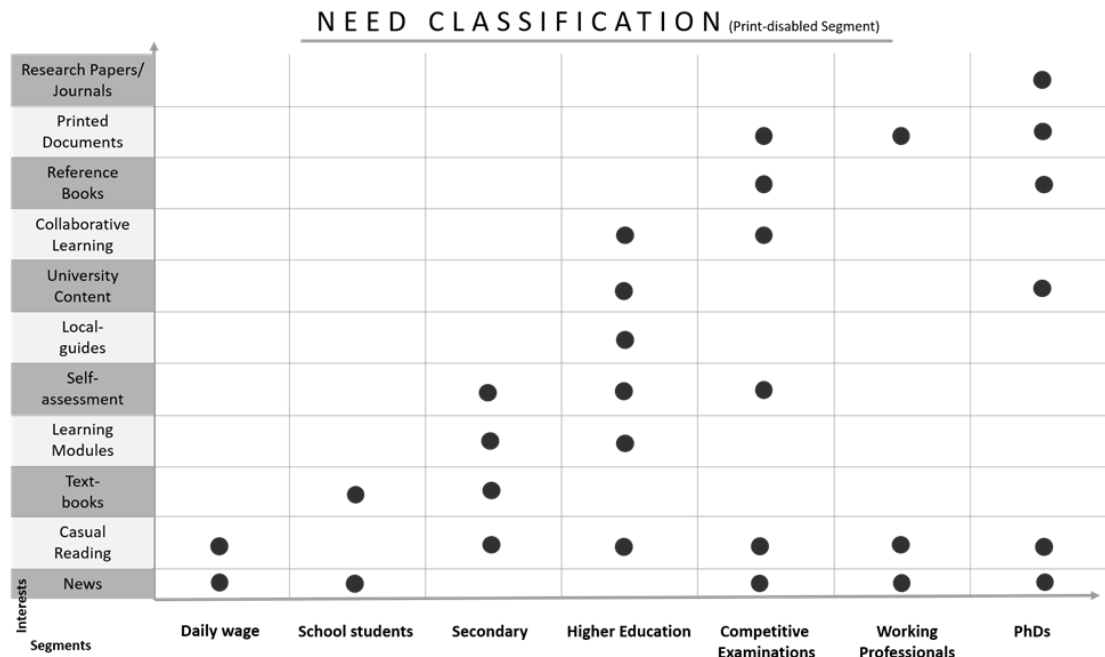


Figure 1: This figure compares the reading and learning needs of the print disabled based on their educational qualification and interests.

Study Outcomes

We bucketed the insights gained from the users into 6 parts.

- 1) Access to Content: Lack of content in Braille due to very few braille press. Dearth of regional-language learning resources are limitedly available in accessible format.
- 2) Understanding: People rely on teachers/peers/parents for reading, recording and taking making notes, which introduces dependency and delays the process. Audio-recording of classroom-teaching has environmental noises; rendering poor audio-quality which mars the comprehensibility lesser understanding of the content. As effective tool as Braille is actually non-inclusive in nature; because visually abled people don't know it which creates a barrier in communication barrier
- 3) Learning: Lack of self-assessment tools in schools and universities; lowers student-confidence and parents see no intellectual development of their kids, leading to drop-outs or discontinued education 50% drop-outs after Class-10. Each student is different, has different learning patterns and pace. Lack of personalization and No recommendation tools quickly sets the monotone in academics resulting in lack of interest. are used to enhance learning.
- 4) Experience: Braille and Audio-books (delivery taking from weeks-to-months) delivers gives a very linear reading experience (i.e. no interactivenss). Audio-books are not updated on regular basis. Lack of interactivenss as mentioned, quickly sets the monotone.

Students buy books from the market based on what their peers told them.

- 5) Aspirations: Availability of content restricted to domains such as Humanities and Languages limits the scope of aspiring for unconventional careers including - IT, Finance, Science, Management etc, thereby limiting their aspirations.
- 6) Connect to Scribes: No single platform to connect scribes with students who are taking some form of examination and need someone to write them on their behalf

Solution Approach

The need of the hour is to have a one-stop solution to access all types of content with key focus on understanding each individual and deliver an enhanced learning experience. We look at the way visually-abled people interact with a physical book, and how they are able to leverage the digital technology to consume information in a very diffused manner.

Thus, the power of digital will be leveraged to offer an immersive learning experience to people who suffer from print and learning disabilities. This will not only kindle their curiosity with learning but also offer a strong foundation at the grass-root level change through education which would bubble up to a nationwide movement of a shift from 'Welfare recipients to Active contributors to the economy'.

With the exploited usage of smartphones over the last 5 years, people have a tool powerful enough to serve as a single point access to multiple resources. This could easily obviate the need for other parallel single-purpose products like Audio/CD players which are still distributed under Govt. Schemes and CSRs.

Any further solutions developed needs to focus on the following

- 1) Generation of content in accessible formats
- 2) Providing the communication medium for distribution
- 3) A single point content accessibility
- 4) Enhanced reading and learning experience which empower users to highlight texts, make/share notes with

peers, summarize documents and contribute to the community through serving as a single point to connect to scribes. Offering an experience at par with their visually-abled peers

Conclusion

There is change in parents' outlook when the vocabulary of their child changes, when he learns new words, new concepts and how this has led to motivated parents who have then decided to continue with their child's education rather than forcing him into some petty job. The power of community is very strong in this space and quick adaptations to new technologies is a general observation on field.

An inclusive platform would focus not only on using technology as an enabler, but also focus equally on unlocking the aspirations that are often subsided (by choice or force) due to resource constraints. A stronger focus on regional languages coupled with increased sensitization of accessibility and inclusiveness both within the society and the governments will transform this passive welfare-recipient mindset into an opportunity space.

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