Educational Content Creation and Sharing by Low-Income Visually Impaired People in India

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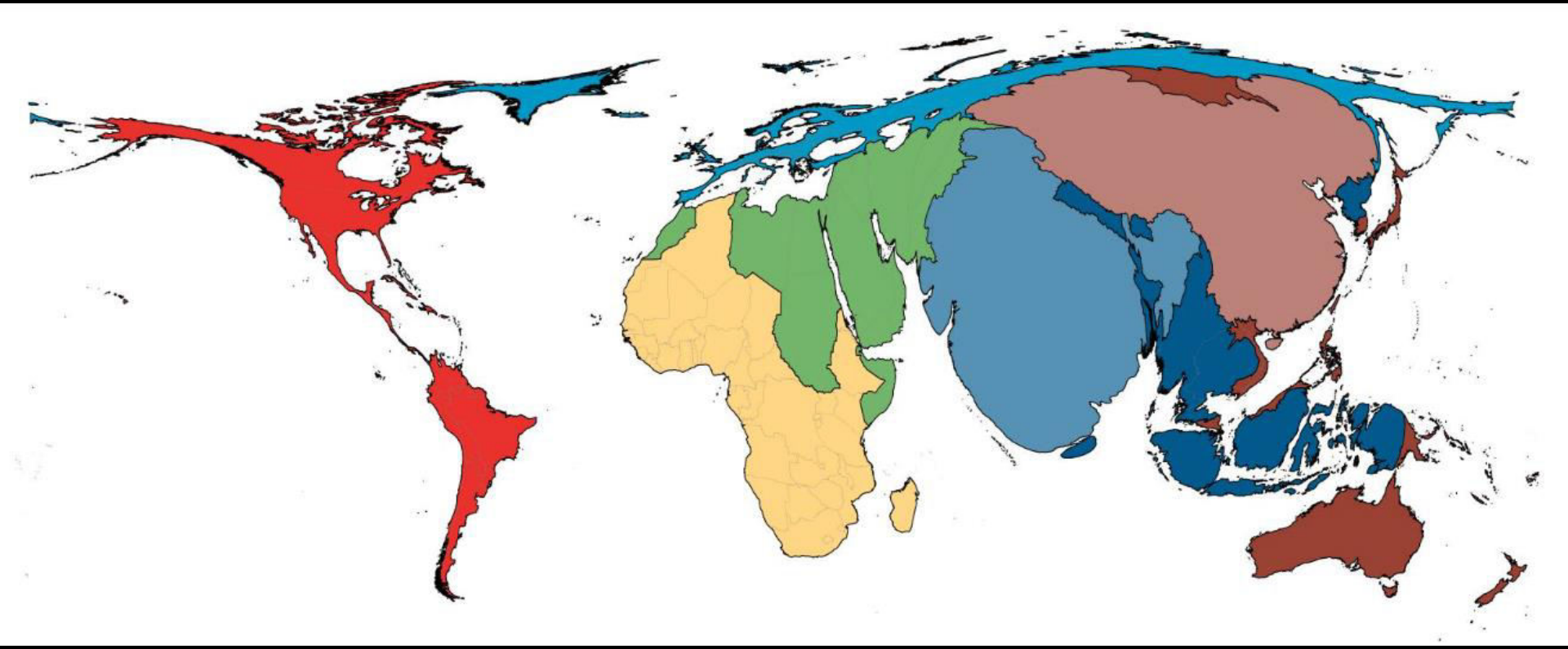
90% VI Live in Developing Countries



A Cartogram showing the prevalence of blindness by WHO region
(using WHO region colors)

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In this paper…

- We interviewed low-income VI people in rural and peri-urban areas across four states India
- We discovered an organic ecosystem of content generated and curated by VI people
- Focus on educational content

Research Goals

1. Understand the challenges faced by rural, low-income visually impaired communities in accessing educational content
2. What are their current solutions and coping mechanisms
3. How to apply that knowledge towards designing new or improved tools/processes for supporting the educational ecosystem

Methods

- 16 in-depth qualitative telephonic interviews of VI stakeholders
- Purposive sampling
- Used open coding and axial coding for analysis
- Analyzed educational services offered by 6 nationwide government entities and NGOs for VI

Demographic Information

Low-income visually impaired people from rural and peri-urban areas in 4 states in India

- Gender: Male (15), Female (1)
- Severity of impairment: Complete (15) or Partial (1)
- Annual family income: Students ($1000), Teachers ($5000)
- Phone: Smartphone (3), Feature/basic phone (13)
- Age: Students (21.9 years), Teachers(36 years)
- Occupation: Students (7), Recent Students (3), Teacher (6)
- Computer usage: Never (9), At least once (6)
- Education: Middle School (2), High School (3), Bachelors (4), Masters (1)

Content Consumption Practices

Prevalence of Audio Books over Braille

Acute shortage of Braille books!!

Professionally Authored Audio Books

Much higher availability than Braille
Fragmented availability (high availability for a few courses)

Most of the content is still unavailable in either format

Content Consumption Devices

- Mobile phone (N=9): Battery powered, ubiquitous availability, saves physical space
- Laptop (N=4): Large storage space
- Tape Recorder (N=4) and CD Player (N=4): Legacy technology to play old collections, Easier forward and reverse operations

I listen to content on a tape recorder or CD player. I don't listen to it on mobile. This is because if we want to rewind on mobile, the whole audio file is rewound and played from the start. In the case of CDs or cassettes, you can rewind just a bit as well.

P14 (Male, Teacher)

Preferred Content Format
Braille or Audio?

- Braille book: Hard to find, Difficult to maintain, Expensive, Heavy, Physical storage space **14**
- Audio book: Low-cost, higher availability **2**

Personally, I prefer Braille. Because when you read it yourself, you understand it better. In the case of audio, you have to listen to it again and again. Moreover, the quality of audio books is dependent on the reader.

P6(Male, Student, Bachelor's)

Personally, I am a supporter of Braille. Braille is the real thing. There are two things: first, eating food yourself. Second, someone else feeds you. Braille is like eating food from your own hands and audio books are as if someone else is feeding you.

P11(Male, Community Champion)

Limited Use of Screen Readers

- 9 never used (3 never heard)
- Limited adoption because of
  - Device related constraints
  - Language of screen reader is English

I don't have good English. So, I have to listen 2-3 times to whatever the talking software says. If I get stuck somewhere, I have to ask someone for help.

P13 (Male, Teacher)

My subject is Hindi. That is why I cannot use JAWS (screen reader software). I have to use recorded material.

P10 (Male, Student, Master's)

Content Sharing Practices

Peer-to-Peer Sharing

- All participants reported sharing educational audio content
- Sharing CDs (6), exchanging memory cards (6), playing it from device (1)
- Bluetooth (4)

We generally give a memory card or CD. Sometimes if a chapter or two is missing, we send it via Bluetooth. I know how to use Bluetooth on some mobile phones, not on all. I remember the sequence of keys that I have to press.

P4 (Male, Student, Class 10)

Content Generation Practices

Professional Production of Audio Books

- High quality educational content is produced by NGOs and government entities
- Duplication because of lack of coordination => Wasted efforts and sparse availability
- On-demand content creation

You can also get your material recorded by NGOs but I have never tried this long process. It takes a lot of time and there are many organizational issues. They have membership fees, and we have to pay charges. For an unemployed person, even 50 Rs (USD 0.8) is a big amount. Hence, I take the material from my friends.

P8 (Male, Finished Bachelor's, Unemployed)

Content Generation by Community Champions

- Many participants reported reaching out to content creators within the community
- Popularity spans multiple geographic regions
- Community champions created lot of impact
  - 75 members, 10 states, 100+ books, 500+ students
  - Financial sustainability is a problem
  - Accentuated the need to use DAISY standard for
    - Creating structured and searchable content
    - Placing bookmarks
    - Regulating the playback speed

User Generated Audio Books

- Buy books for sighted people and ask friends, family, social workers, anyone to record it for them (free service)
- Hire a reader as an individual or group and record him reading the content by using a mobile phone, tape recorder or a laptop (paid service)
- Abundant user generated content but no organization/coordination
- User generated content for Braille is non-existent

Recommendations

Strengthening Content Consumption Practices

- Improve discoverability of educational content by creating a central repository
- Provide flexible media playback on feature phones
- Design speech and language technologies for resource constrained local languages

Strengthening Content Sharing Practices

- Improve Bluetooth interface by leveraging audio rather than text for pairing devices
- Create New smartphone applications for simple peer-to-peer media transfer

Strengthening Content Creation Practices

- Create user-friendly mobile/desktop applications for authoring and managing audio content that uses the DAISY standard

- Enable long-distance dictation of content through IVR and Smartphone
  - Crowdsourcing on basic phones?

Summary

- We report content authoring and sharing by low-income VI people in rural and peri-urban India
  - Focus on educational content
  - Reliance on low-cost technologies
  - Content generated and curated by rural VI people

*Rare example of an **organic** ecosystem consisting of educational usage of mobile phones by a low-income population, **without any outside intervention***

Questions?

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