Technology and Disability in the Developing World: The UN Convention and Assistive Technology

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MSR India Summer School
June 2010
Why am I interested in the subject...
Why is technology and disability relevant to the developing world?

- **Exclusion**
  - Extremely high poverty rates, up to 97% unemployment
  - High exclusion from education

- **Social issues / Religion**
  - Punitive
  - Sympathetic
  - Virtuous suffering

- **Public visibility / ‘economic engineering’**
  - Massage / Lottery
  - Charity

- **Difficulty of building AT research in the developing world**
  - Funding
  - Priority (who does a developmental state work for)

- **Because development is inclusion**
Types of assistive accommodation

- Assistive tech v/s Accessibility
  - AT is some technology artifact that ameliorates physical impact of some disablement
  - Accessibility is about making an existing system of functioning usable by as many as possible

<table>
<thead>
<tr>
<th>Disablement</th>
<th>Material</th>
<th>Technological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor (MU)</td>
<td>Pointers</td>
<td>Motor and paraplegic wheelchairs, voice-based computer navigation</td>
</tr>
<tr>
<td>Motor (H)</td>
<td>Arm stabilizers/guides, Pencil grip, page-turners, stencils</td>
<td>Custom keyboards/mouse, wrist supports, Speech recognition</td>
</tr>
<tr>
<td>Mobility (LB)</td>
<td>Ramps, railings, (active) wheelchairs</td>
<td>Power wheelchairs</td>
</tr>
<tr>
<td>Hearing</td>
<td>Sign language interpreters in classrooms</td>
<td>Closed captioning, hearing aids, cochlear implants</td>
</tr>
<tr>
<td>Speech</td>
<td>Pen/paper</td>
<td>Voice output devices</td>
</tr>
<tr>
<td>Cognitive</td>
<td>Color coding, appointment books</td>
<td>Schedulers, word prediction software</td>
</tr>
</tbody>
</table>
Economics and Geography of AT

- **Who is pays?**
  - Families
  - International agencies
  - NGOs/DPOs
  - Governments

- **Who funds research?**
  - Universities
  - Private foundations
  - Governmental agencies

- **Limitations:**
  - Personal: Literacy, Poverty
  - Structural: Institutions, Low-cost AT
Overview of international interest in disability

Traditionally, “positive” action related to disability frequently around warfare (prosthetics, plastic surgery)

1940s-50s onwards -- early UN attention to disability in the post war period

1960s-70s, early rights-based action in disability law

1980s-90s - growing international agency attention
  1981- Year of Disabled Persons
  1982 – General Assembly adopted the World Programme of Action (WPA)
  1983-92 decade of disabled persons
  1993, standard rules for equalization of opportunities
UN Convention on Rights of Persons with Disabilities (UNCRPD)

- Opened for signature March 2007
  - Highest first day signatories in history
  - Currently 144 signatories, about 80 ratifications, 44 OP

- Why a convention? Repetitive?
  - 1983-1992 Decade of the Disabled
  - UN GA 1993 ‘Standard Rules on Equalization of Opp...’
  - Shouldn’t UNHCR cover disability?

- What does it specify
  - Defines rights: health, political participation, education, non-discrimination etc
  - Recommends steps for states: endorsements of technologies, support for community groups, peer facilitation, education etc.

- Important rights-based move away from medical model
Signatories to the UNCRPD

- Not Signed
- Signed Convention
- Signed Convention & Protocol
- Ratified Convention
- Ratified Convention & Protocol
Why should technologists care?

- Several articles relating to assistive technology:
  - Art 4: Promote R&D of new tech at affordable cost
  - Art 9: Promote early stage design and prodn of accessible ICTs
  - Art 20: Facilitate access to mobility aids and AT
  - Art 21: Urge accessibility to private concerns online
  - Art 21: Reasonable accommodation at the workplace

- Current AT research and product availability worldwide low
  - Most AT research located in US, Japan, S. Korea, W. Europe
  - AT typically designed for users from these countries

- A small sampling of vision-impairment technologies:

<table>
<thead>
<tr>
<th>Low vision</th>
<th>Blind &amp; Legally Blind</th>
<th>Deaf Blind</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hi resolution / large screens / glare guards</td>
<td>Screen Readers</td>
<td></td>
</tr>
<tr>
<td>CCTV</td>
<td>Braille Display/ Printers</td>
<td></td>
</tr>
<tr>
<td>Audio output devices</td>
<td>Deaf Blind Communicators</td>
<td></td>
</tr>
<tr>
<td>Screen magnifiers</td>
<td>OCR Systems</td>
<td></td>
</tr>
<tr>
<td>Tactile art</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Technology agenda going ahead (vision)

- E.g: Devices & Networks
  - Low-cost screen readers
    - Improvements on NVDA or development
    - Development of web-based systems (WebAnywhere)
    - Language support for screen readers
    - Low-cost Braille displays
  - Cell-phones
    - Basic accessibility features
    - Navigation / low-cost A-GPS
    - Audio interfaces

- E.g: Technology Training
  - Community training centers
    - Braille training centers
    - Screen reader access in libraries

- Rigorous economic analysis of the cost of the convention in terms of AT

<table>
<thead>
<tr>
<th>Countries</th>
<th>Blind Population</th>
<th>Total Cost in US$ Million</th>
<th>Cost /GDP (%)</th>
<th>Shared Model Cost in US Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>80531</td>
<td>0 - 96.6</td>
<td>0 - 0.01</td>
<td>0 - 0.96</td>
</tr>
<tr>
<td>Brazil</td>
<td>744526</td>
<td>0 - 893.4</td>
<td>0 - 0.06</td>
<td>0 - 8.93</td>
</tr>
<tr>
<td>Mongolia</td>
<td>11126</td>
<td>0 - 13.4</td>
<td>0 - 0.31</td>
<td>0 - 0.13</td>
</tr>
<tr>
<td>Niger</td>
<td>45943</td>
<td>0 - 55.1</td>
<td>0 - 1.29</td>
<td>0 - 0.55</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>243741</td>
<td>0 - 292.5</td>
<td>0 - 0.01</td>
<td>0 - 2.92</td>
</tr>
</tbody>
</table>
Why should economists (or legal scholars) care?

- The “cost” of the convention has not been clearly articulated
  - The legislative measures relating to the convention are easier to fix
  - Several recommendations need both significant social and economic investment
  - Legal scholars concerned about the consequences of non-compliance
- Important issues around labor market participation of persons with disabilities

<table>
<thead>
<tr>
<th>Countries</th>
<th>Date of Ratification</th>
<th>Blind Population</th>
<th>Real GDP PCI in US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>08/2009</td>
<td>80,531</td>
<td>41,982</td>
</tr>
<tr>
<td>Brazil</td>
<td>08/2008</td>
<td>744,526</td>
<td>7,737</td>
</tr>
<tr>
<td>Mongolia</td>
<td>05/2009</td>
<td>11,126</td>
<td>1,564</td>
</tr>
<tr>
<td>Niger</td>
<td>06/2008</td>
<td>45,943</td>
<td>375</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>09/2009</td>
<td>243,741</td>
<td>35,728</td>
</tr>
</tbody>
</table>
## How much does AT cost?

<table>
<thead>
<tr>
<th>Technology</th>
<th>H/W &amp; S/W requirement</th>
<th>Cost (Range)</th>
<th>Addl. Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Braille Translators</strong></td>
<td>CD-ROM Drive, IBM PC, 150MB or higher memory</td>
<td>$200-$1000</td>
<td>Braille Printer, Expensive Paper</td>
</tr>
<tr>
<td><strong>Optical Character Recognition Systems</strong></td>
<td>CD-ROM Drive, IBM PC, 500MB memory, Sound Card, Scanner</td>
<td>$1000-$4000</td>
<td>Speech synthesizer, Braille display</td>
</tr>
<tr>
<td><strong>Screen Readers</strong></td>
<td>IBM Compatible PC, 20MB-125MB and 256MB RAM, Sound Card</td>
<td>$0-$1500</td>
<td>Speech synthesizer</td>
</tr>
<tr>
<td><strong>Screen Magnification Systems</strong></td>
<td>CD-ROM Drive, IBM Compatible PC RAM 256MB, Sound Card</td>
<td>$300-$600</td>
<td>Speech synthesizer and screen readers if speech output needed</td>
</tr>
<tr>
<td><strong>Braille Displays</strong></td>
<td>IBM Compatible PC</td>
<td>$3,500 to $15,000</td>
<td>Screen reader</td>
</tr>
<tr>
<td><strong>Braille Printers</strong></td>
<td>IBM Compatible PC</td>
<td>$1,800 to $80,000</td>
<td>Screen Reader, Paper</td>
</tr>
<tr>
<td><strong>CCTVs/Video Magnifiers</strong></td>
<td>NA</td>
<td>$1400-$2700</td>
<td>CCTV-compatible Computer</td>
</tr>
</tbody>
</table>
(Briefly back to my favourite topic) “Disability is...”

Sympathetic

Suffering

Punitive
Empirical research in Latin America

- **Goals**
  - Examine technology and employability in 5 countries

- **Instrument (for Latin America):**
  - Qualitative interview-based methodology
  - Open-ended semi-structured interviews conducted over four months of field work
  - Interviews conducted in Spanish; Over 800 pages of transcribed interviews

- **Sample Population:**
  - People with Disabilities primarily mobility, auditory and visual impairments
  - Recruited through partners

- **Countries:**
  - Colombia
  - Ecuador
  - Mexico
  - Guatemala
  - Venezuela
Disability in Latin America

- Approx. 50 million people in Latin America and the Caribbean are disabled, 10% of the population.
- 80-90% are unemployed or outside the workforce
- 82% are living in poverty (World Bank, 2004)
- From the medical model to the social model
- Social movements led by PWD
  - “Nothing about us, without us.”
- Stigmatization and discrimination, social exclusion
Technology as a Disabling Factor

- Effects of access to centers
- Least disabled have the most access
- Further excludes certain populations
  - ICTs
  - Labor market
- Selective access by type of disability
“So we go, we explain to the company about our programs, we actually show them how they work because that’s quite an important part because they always wonder how a blind person is actually able to use a computer because we are all accustomed to using a computer by sight.”

Jose’, computer teacher for the visually impaired, Guatemala
“What we need is a **source of employment**...there is a new law that says that every company must have at least three per cent of their workforce be people with disabilities but no one actually follows through with this. They are hiring people with disabilities in public companies but not in private companies because **private businesspeople are not interested in collaborating** with this kind of requirement or to support the handicapped population, or the disabled.”

‘Felipe’, Ecuador (visual impairment)
“They shut the doors in our faces at companies and refuse us employment so we wanted to convene here in the library as the National Association for the Blind in order to inform those companies that we are useful, productive people and just because we have a disability, that doesn’t mean we are invalid... in order to do this we have to continue training and studying and so we that’s why we come here to the library in order to stay up to date on systems and informatics training with the use of a program called Jaws.”

‘Martin’, Colombia (visual impairment)

This isn’t just a Latin American phenomenon, Spain’s most funded disability-related organization also runs its lottery
Libraries v/s Telecenters

- Public space
  - CSR fills access gap, but temporary
  - Rights-based approach, state responsibility
  - UN Convention Mandates

- Visibility

- Telecenters better with jobs, but what kind?
  - Employability as metric defined by funders
  - Technology as training defined by funders

- Technology center as place of community
Simple technology

Pics: CITTI project
Case for ICTD work in AT/Accessibility

- Need clearly present, not pushing tech where non-tech option available
- Cellphones, the big thing
  - Information organization (Cognitive difficulties)
  - Navigation
  - Basic interaction (D/B)
- Risks
  - For rather than with disabled individuals
  - Time cost fundamental to the person being designed for
  - Pilot projects much more risky
  - AT (like any other field) follows trends – e.g. Amputatees
MISS BATTAMBANG
Dos Sophanap
Age: 18
Hometown: Damnak Lourn Village, Svay Por District
Mine accident: 1996
Marital status: Single
Kid(s): None
Occupation: Student
Future ambition: Accountant for an NGO
Favorite color: Red
Clothes: American Apparel, $32
Shoe and accessories: Myft Design, $17
Location: The Quay Hotel, Phnom Penh
www.thequayhotel.com
Mine: FMA-2 anti-personnel, $10
Release: Pressure ($ kg or more)
Explosive: 100 g TNT
Producer: Former Yugoslavia

Back...
Thanks

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