Bridging the Digital Divide: Promises and Pitfalls of Higher Education ICT in Bangladesh

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Digital Divide

- Connecting a new million people is more important than doubling an already astronomical bandwidth by another factor of 2. The later is child’s play compared to the intellectual challenge offered by the former-by all senses-as challenge of science and as a need for fundamental new technology and innovation.

- 92+ countries have REN what about the others? There are types of digital divide.
- Is there a pattern? Perhaps perhaps not!
Policy Concern

- Traditional developmental funding agencies have shied away from funding higher education. Questionable policy when it comes to REN!

- Almost all development effort remain inherently unstable and unsustainable without the indigenous higher education community involvement.
Few Research Gems in Bangladesh
Can we afford to neglect?
Micro-Credit & Community Health

- Community Engineering.
- Has strongly integrated community healthcare component.

- Hot bed of cutting edge economic research in poverty elimination.
- Grameen Programs has been replicated in more than 100 countries touching the life of 100 million people worldwide.

- World Bank experts estimated that 500 million people benefited from these ideas from a total of three billion poor people.

- Armchair “economist” vs. practical results.
- Thousands of field researchers across 100 countries. Severe need to communicate for years to come.
Mobile Phone for Social Improvement

- If you want to see how radically technology can change quality of life come to Bangladesh.

- Grameen Telecom facilitates a 'Village Phone' program, providing a mobile phone to villages without access to fixed land lines. This mobile phone is then cared for by a woman in the village, who charges for the use of the phone and pays a proportion back to Grameen Phone.

- As of April 2006, Grameen Phone is the largest mobile phone company in Bangladesh, with 6.4 million subscribers. Grameen Phone Foundation.

"The world's poorest, mostly women, have proven that they can lift themselves from poverty if given the opportunity."
Alex Counts, President, GRUSA
Rice Research

- Bangladesh Rice Research Institute (BRRI) is an extensive chain of research facilities. It has so far developed 31 varieties that covers 52 percent of the rice area and 70 percent of the total rice production in Bangladesh.

- Identified 175 insects and 31 diseases of rice. Developed varietal resistance, chemical and cultural control practices which are environmental friendly.

- Developed irrigation water saving technologies. Appropriate compaction and sand-cement mortar reduce water losses by about 40 percent. Supplemental irrigation at the critical crop growth stages increase yields up to 50 percent and reduces the negative effect of drought.

- BRRI returned 36 to 38 (Gill 1983, Dey and Evenson 1992, Mustafi 1997) dollars per dollar spent.

- BRRI breeding lines have also been released in the world during 1975 including Myanmar, Vietnam, India, Nepal, China, Bhutan, Burundi, Burkina Faso, Gambia, Ghana, Kenya, Sierra leone.

- A major contributor to IRRI’s Rice Knowledge Bank. One of the first and most comprehensive digital rice-production library containing an ever-increasing wealth of information on training and rice production for grass root farmers.
ICCDRB

- Originally established as the Cholera Research Laboratory in 1960, today the Centre’s work encompasses a full spectrum of issues related to child health, infectious disease and vaccine sciences, reproductive health, nutrition, population sciences, health systems research, safe water, HIV/AIDS and poverty and health.

- Today it remains the only international health research institution based in a developing country.
Other Notable Resources

- Open Heart Surgery for Poor! BSMMU, Dhaka Project with help from Indian surgeons. Surgery under US$1000.

- Flood impact, management.

- Impact of global warming, sea level change research.

- Disaster management (offered team for Katrina after math).
### South Asia*

#### Table-2 REN & HEI in South Asia [6,8]

<table>
<thead>
<tr>
<th>Country</th>
<th>HEI</th>
<th>REN</th>
<th>DLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>320 (university only)</td>
<td>ERNET</td>
<td>YES</td>
</tr>
<tr>
<td>Pakistan</td>
<td>110</td>
<td>PERN</td>
<td>YES</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>104</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myanmar</td>
<td>50</td>
<td>E-EDUCATION WAN</td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>27</td>
<td>LEARN</td>
<td>YES</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bhutan</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maldives</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Universities

Table-3 Various Types of HEIs in Bangladesh

<table>
<thead>
<tr>
<th>Types</th>
<th>Institutions</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Universities [1]</td>
<td>19</td>
<td>112,327</td>
</tr>
<tr>
<td>Private &amp; International Universities [1]</td>
<td>54</td>
<td>46,080</td>
</tr>
<tr>
<td>Public Medical &amp; Dental Colleges [2]</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Private Medical &amp; Dental Colleges</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Total Conventional R&amp;D Universities</td>
<td>104</td>
<td>158407</td>
</tr>
<tr>
<td>National University Public &amp; Private Colleges [1]</td>
<td>1596</td>
<td>416,646</td>
</tr>
<tr>
<td>Other Collages Affiliated with Public Universities [1]</td>
<td>1548</td>
<td></td>
</tr>
<tr>
<td>Kamil Maddrassas [2]</td>
<td>147</td>
<td>92,000</td>
</tr>
<tr>
<td>Open University (National, Regional &amp; Local Centers) [2]</td>
<td>1013</td>
<td>437,489</td>
</tr>
<tr>
<td>Planned Public Universities [1]</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4417</td>
<td>1104542</td>
</tr>
</tbody>
</table>
BERNET Initiatives

- Bangladesh Education and Research Network (BERNET) proposed in 1997 and connected 2 with radio-links and 5 more universities with dialup links.

- Fell apart soon!

- BUET acquired its own VSAT and DU got BTTB as ISP.
University Connectivity

- There were two past efforts to form multi-institutional education/research network. Back in 1997 UGC initiated the Bangladesh Education and Research Network (BERNET).

- In 1998 another initiative called BANSLINK tried to connect libraries of some science and technology based universities and research institutions. Unfortunately, both failed.

- A 2005 survey reveals 38 of the 52 private and 9 out of the 21 public universities- roughly half of the universities, have internet connectivity.

- VSAT in 3 universities (.5-2 Mbps) to ASIA SAT. Three universities have fiber campus backbones.

- For three years UGC has a plan in table to provide internet access to the 19 public universities via regular ISPs- though it is still in wait 128KKps- 512 Kbps)
Applications

- Faculty and graduate students have email from university. Most undergraduates specially in public universities don’t have. They are yahoo and lately gmail customers.

- Universities have web-face. Most private universities have course-management systems. (At least two local SW companies are developing local systems).

- None of the public universities have DL. Private universities provides access to mostly free DLs such as jstore, etc.

- Private universities have video conferencing facilities.
## R&D Institutions

<table>
<thead>
<tr>
<th>Type of R&amp;D Institutions</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Institute/Center-Agriculture</td>
<td>15</td>
</tr>
<tr>
<td>Research Institute/Center-Biology</td>
<td>7</td>
</tr>
<tr>
<td>Research Institute/Center-Energy</td>
<td>5</td>
</tr>
<tr>
<td>Research Institute/Center-Engineering</td>
<td>14</td>
</tr>
<tr>
<td>Research Institute/Center-Medical</td>
<td>15</td>
</tr>
<tr>
<td>Research Institute/Center-Weather</td>
<td>2</td>
</tr>
<tr>
<td>Research Academy</td>
<td>3</td>
</tr>
<tr>
<td>ARI Administrative Centers</td>
<td>10</td>
</tr>
<tr>
<td>Collections-Major Library (Non-University)</td>
<td>7</td>
</tr>
<tr>
<td>Collections-Museum</td>
<td>8</td>
</tr>
<tr>
<td>Other Institutes &amp; Centers</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>92</strong></td>
</tr>
</tbody>
</table>
Fiber

- Bangladesh National Railway- has approximately 1,800-km STM-4 (622 Mbps) optical fiber touching over 300 of the 454 rail stations reaching most corners of the country. Only 25-40% capacity is currently being used by Grameen Phone [13].

- Telephone and Telegraph Board (BTTB) has 1365 km STM-14/4/1 (2.488 Gbps/622Mbps/155 Mbps) of Optical Fiber. BTTB is running 9 Internet PoPs. Service reaches all 64 districts and 164 Upazillas.

- In capital Dhaka, BTTB is building an STM-16 all fiber ring [14].

- A third nationwide 1200 km fiber system touching all the existing power stations and grid sub-stations is now being installed by the Power Grid Company (PGCB). PGCB expects to use only 5-10% capacity and sell 90%. 
Hundred’s of rivers crisscross the landscape. Fiber is challenging.
International Connectivity

- Until now the entire data communication was via 34 official ASIASAT and INTELSAT. It is officially believed that total outgoing Internet capacity is only 50 Mbps [14]!

- However, this situation changes with the debut of the country’s first International submarine cable SEAMEWE4. It has landed in August of 2006.

- BTTB owns its 10 Gbps capacity (7.04%). BTTB estimates, until 2010 only 20% of its capacity will be used.

- BREN can potentially meet its requirement of 155-622 Mbps from these cable systems.

<table>
<thead>
<tr>
<th>Applications</th>
<th>Existing Use 2005</th>
<th>Projected Use 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Bandwidth</td>
<td>50 Mbps</td>
<td>500 Mbps</td>
</tr>
<tr>
<td>Voice Circuits</td>
<td>150 Mbps</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>Multimedia</td>
<td></td>
<td>200 Mbps</td>
</tr>
<tr>
<td>Other New Application</td>
<td></td>
<td>100 Mbps</td>
</tr>
<tr>
<td>Call Center Type</td>
<td></td>
<td>100 Mbps</td>
</tr>
<tr>
<td>Total</td>
<td>2 Gbps</td>
<td></td>
</tr>
<tr>
<td>BREN (25% of unused capacity)</td>
<td></td>
<td>922 Mbps</td>
</tr>
</tbody>
</table>
Status Summary

- **Digital Divide and ICT**
  - Consortium is a new concept (huge self organization challenge)
  - Universities technology are always 10-15 years back technologically.
  - Policy is 10-20 years behind.
  - ICT “communication” is supposed to reduce this Gap.
  - But how do you get ICT in place??

- **Infrastructure**
  - Some Fibers are there to start backbone immediately.
  - Some type of wireless can be used to provide instant access links
  - ’50’ well trained network engineers to do the stitching is missing.
  - No excess fund (USD $80-100 million for 19 universities)

- **Positive**
  - No legacy problem.
  - Very little technical and financial seeding can have magnified impact.
ICT in Healthcare R&D: Research

- Institutions like ICDDR,B are strong, but can be further strengthened by streamlining field data collection, communication (internet or phone based?).

- Management, analyses and reporting can be improved by real-time ICT.
ICT in Healthcare R&D: Education

- Special procedures/skill transfer for doctors (just prepared to receiver).

- High demand for nursing training.

- Training a doctor is more expensive in US, modernized medical schools can help supply doctors there and beyond. Highl cost competitive.
ICT in Healthcare: Delivery

- Hospital/ Healthcare management system in antiquated.

- Private facilities have PACS/ HIS /EMR system of local built. No linkup. In sharp contrast public hospitals have near zero ICT (compare with about 25% deployment in US)

- Community Medicine/Telemedicine: Inverse human/instrument cost.

- Indigenous methods need research and preservation (Ayrveda). digital technology can help (Chinese experience)

- Something to learn from South Asia too.. human vs. technology? Quality of health care vs. loss of human touch??
Planning: Engineering affordability?

- Cost of Technology will be issue for South Asia.

- High-edge technology (including medical technology) perhaps should be engineered to operate with graceful degradation in asymmetric network. Will HDTV transmission mean all or none for a remote village doctor?

- Cost of human doctor vs. cost of technology is inverse.
Planning: Rethink Metric of Success?

- In any “networking” - connecting a million is perhaps more important than doubling the speed.

- Perhaps any metric of success in a major networking initiative must include the humanity aspect - at the least a new user count - beyond its current obsession with speed.

- Many digital divide countries will require tiny investment to jumpstart REN and create a very large payoff for the investment.
Planning: Development Funding?

- Traditional developmental funding agencies have shied away from funding higher education. Questionable policy when it comes to REN!

- Almost all development effort remain inherently unstable and unsustainable without the indigenous higher education community involvement.

- It is impossible to bridge the digital divide without mending the ICT divide of their higher education institutions.

- Are the RENs ready?

- The requirement that infrastructure projects like REN can get funded being tied to a ground level project puts undue burden on the proposers and might make an already difficult task even impossible.
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Bangladesh Survey Reports: