Readings and Discussion
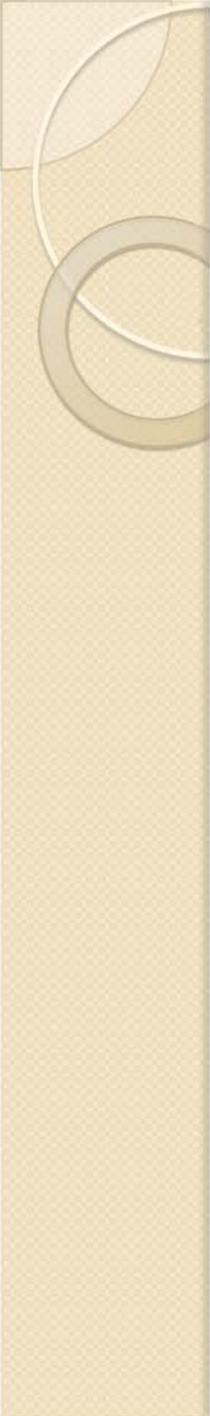
Michael Gordon

MIT CSAIL

Agenda

Richard Heeks, "ICT4D 2.0: The Next Phase of Applying ICT for International Development," Computer, vol. 41, Jun. 2008, pp. 26-33.

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Why ICT4D?

- Moral argument (diminishing returns for first-world technology)
- "Enlightened" Self-interest
  - "Problem of the poor today can become our problems tomorrow"
  - New markets (poor as consumers)
    - The poor have disposable income and they prioritize ICT
- "Personal" self-interest
  - Projects are interesting and satisfying

# The History of ICT4D: ICT4D 0.0

- Until 1990 computing for development focused on:
  - IT for internal government administration
  - Corporations viewed IT as a tool for delivering economic growth in the private sector

- But then came the Internet and the Millennium Development Goals (1996)
  - "new tools in search of a purpose"

ICT4D 1.0: 1990s - 2000

- Era of the rural telecenter
  - Room with one or more internet-connected PCs
- Imposed existing designs and expected the poor to adapt to them

- Most ended in failure which led to new watchwords:
  - Sustainability: failed to survive
 - Scalability: limited reach
  - Evaluation: all hype

Question: What are your thoughts/experiences with rural Telecenters?
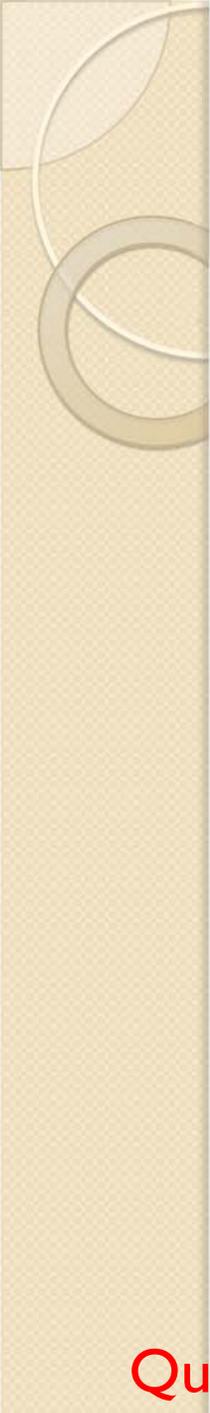
ICT4D 2.0

- Pushing the internet connected PC is difficult and recent innovations have focused on:
  - Terminals: OLPC
  - Telecommunications: wireless
  - Power: generation, storage, and consumption
- Heeks: Why push down this route when we can jump ship to a more appropriate technology: Mobiles!

Question: What are your thoughts/experiences with the OLPC?
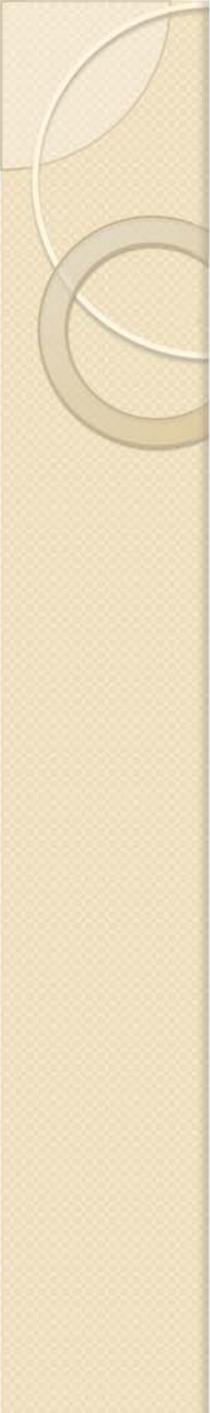
Trends and Questions

- Incredible acceptance and growth rates of mobile telephony
- How do we reach the last "half billion"?
- Should the internet be the focus?
- What can be done with existing technologies?
  - Calls
  - SMS
  - Radios (80% penetration in DCs)
  - Televisions (50 penetration in DCs)
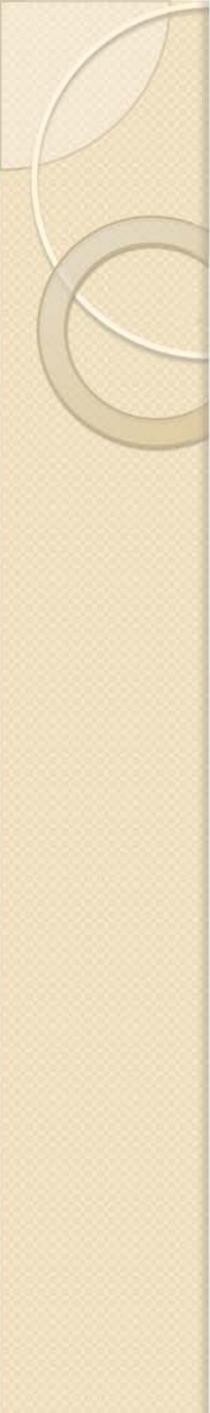
New Applications

- Equating poor with illiteracy is a common mistake:
  - \> 50% adults in poorest countries are literate
  - 2/3 of 15 – 24 yr olds are literate
  - Villages have infomediaries
- Still need to create user interfaces appropriate for these populations
 - Audio-visual
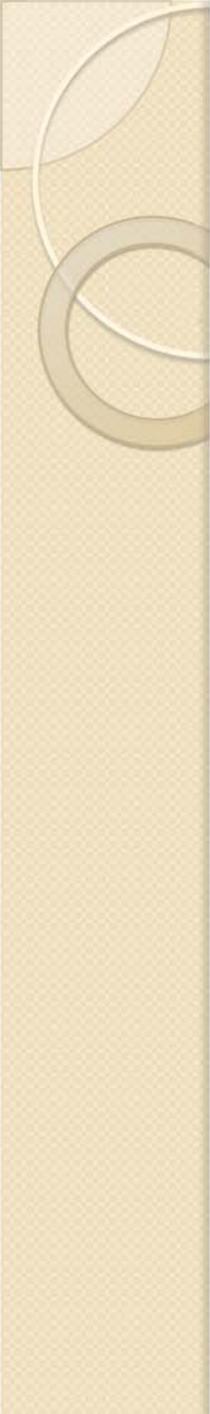
Filling the Hardware-Interface Husk

- Content: appropriate and narrowing
  - Community radio and participatory video
- Interaction and communication
- Services
  - E-government
  - M-development: hang services on growing phone base
- Production
  - Create incomes for the poor
  - Authors of content

Approaches to ICT4D

- "Passive diffusion"
  - The market will decide if ICT4D has value
  - Combination of:
    - private firms' search for profit
    - Poor's search for value
  - Any attempt to intervene would be wasteful

- "Active innovation"
  - Market will not deliver
  - intervention required that will help meet development goals

Discussion: Comments on "passive diffusion" versus "active innovation"?
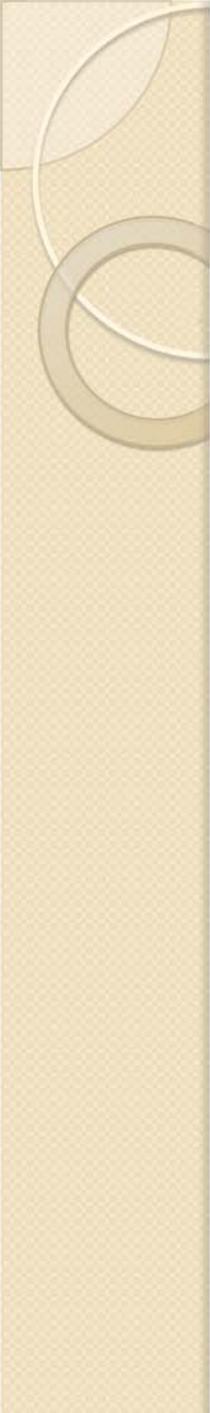
How To Innovate

- "Pro-poor"
  - Outside poor communities on their behalf
  - Design versus reality gaps
  - Some successes: pre-paid mobile plans
- "Para-poor"
  - Working alongside poor
  - Participative, user-engaged design process
  - Problems:
    - Who participates matters
  - Our class
- "Per-Poor"
  - Within and by poor community

Per-Poor

- Poor are adapting and applying technology in new ways:
  - New processes
    - Flashing
  - New business models
    - Mobile transactions of airtime
  - New products
    - Re-chipping phones (latest look without the $$$)
- My $0.02
  - Education the key to per-poor
    - Ex: MIT's EPROM and AITI

Question: Other examples of per-poor innovation?

Integrating Worldviews

- Technologists cannot stand alone
  - The problem with ICT4D 1.0
- Science and technology are climbing the development scale.
  - Korean and Taiwan (NICs)
- Integrate IS, development studies, and CS.
  - Multidisciplinary teams

- Don't trap ICT as a tool to serve individual development goals
  - Misses out on ICT's roll as a linking technology
  - Doesn't let the poor innovate

What do you think of your project and your project team?

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Stages of Design in Technology for Global Development

- Text-free UI
  - Design UI's for the 1-2 billion illiterate individuals
  - Regular UI's are text-heavy and designed for literate

Journey of design:
- Voice annotations on everything
- What do users want to know? (Job listings)
- Graphical representations (cartoons work well)
- TV and word of mouth prevailed as information channels
- Everyone could read numbers

(Indrani Medhi)

TextFree UI

- Armed with this knowledge they designed text-free monster.com and tested it.
- Only 30 percent completed the assigned task.
- The problem was not the UI:
  - Users were concerned they would break PC
  - Why use the PC? Just ask someone…
  - How did the box work?
- Solution: create a short movie that explained the *context* of the application
  - Informed by the Bollywood culture.
- After watching the video, completion rate was 100%.
 - Help build the cognitive model of the technology for the user.
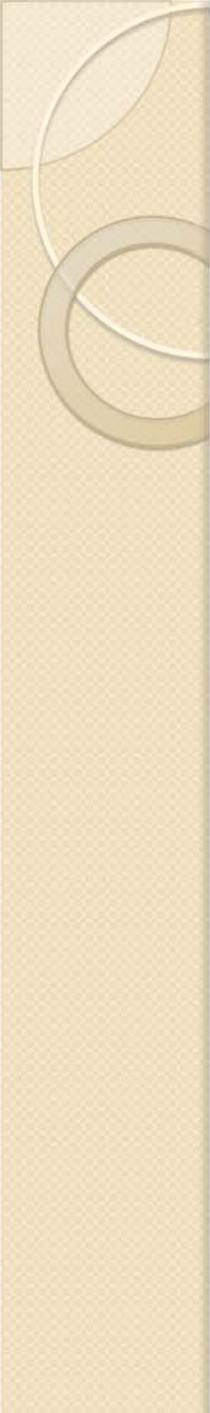
Design Stages of ICT4D Projects

- <u>Wonder</u>: Huge problem, why does it persist?
- <u>Exuberance</u>: This technology will solve the world's problems!
- <u>Realization</u>: Discover the realities; it does not work. What are the problems?
- <u>Adaption</u>: Create a modified/new solution that solves the problems.
- <u>Identification</u>: Understand the gap between the initial and the final solution.
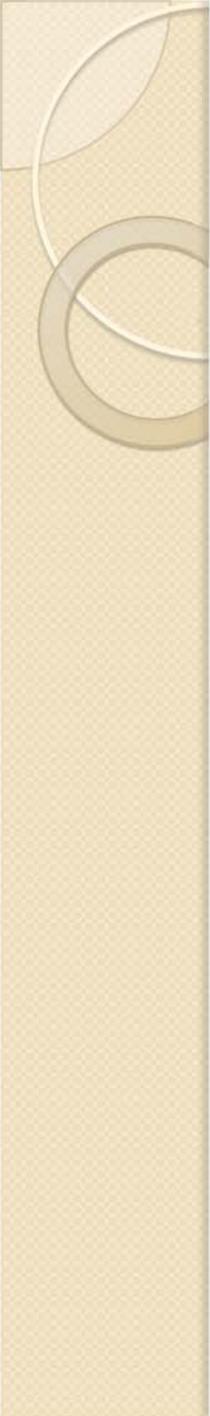
Example: Microfinance

- Wonder: Microfinance is great! Can we lower interest rates by lowering transaction costs?
- Exuberance:
  - Use mobile app to transfer data on a new applicant to head office. Verify data, aid in decision, update back-end database.
  - Halved per-form processing cost
- Realization: Mobile phones are expensive, after 6 years, could not recover costs.
- Adaption: Manual frontend data management linked to backend database.
- Identification:
  - Low cost of manual labor and manual data transport
 - High cost of technology
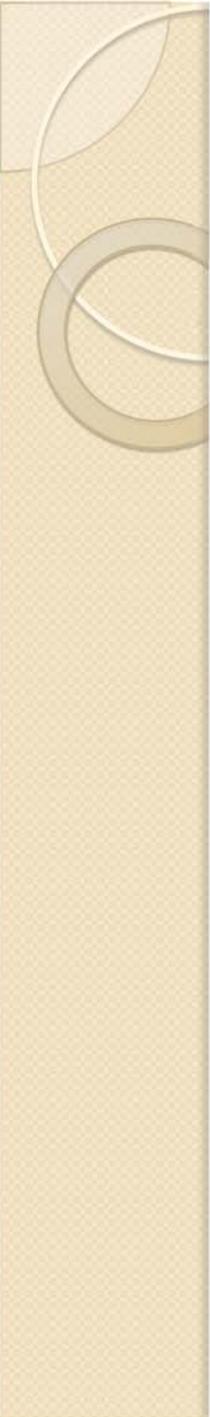
Lessons Learned

- Time in field
  - Most critical factor
  - Rapid prototyping in field: "fail early and fail often"
  - Partner with nonprofits
    - Access to target communities
    - Nonprofits are trusted by community
- Honesty about what works:
  - Does it make sense economically?
  - Have critics around (peer-review process of this class)
  - Have social scientists in the group
- Accept simple solutions!
  - Problems are sometimes not in the technology but how to get people to use it.
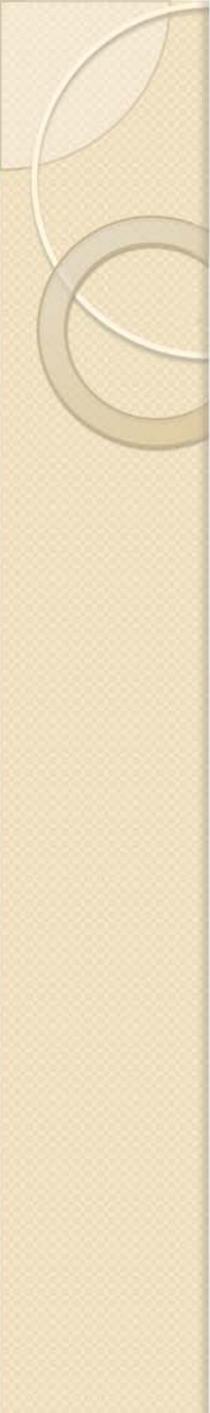
Discussion

- Instructors and students: Give us experiences from your past and future projects trying to fit them into the 5 stages.

- Do you think that every project will go through these 5 stages?

- What is the practical value of knowing these 5 stages?
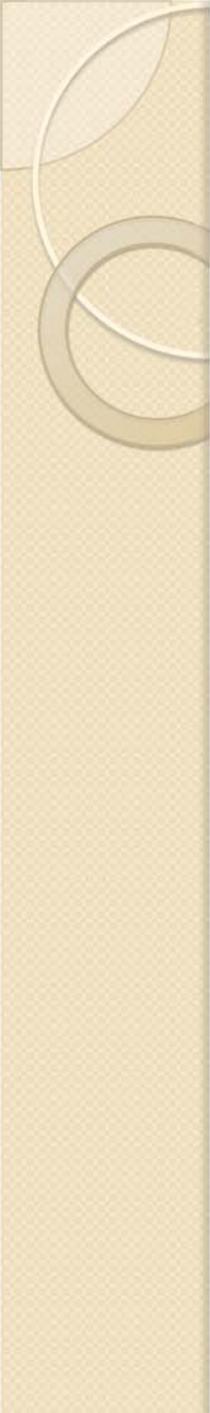
Warana Unwired

- Wonder: 800 Million marginal farmers around world
- Exuberance: Internet for farmers brings education, telemedicine, and knowledge
- Realization:
  - Farmers unable to use internet,
  - Only used PCs to check on payment schedule and inventory
  - High maintenance costs
- Adaptation: Replace computer with cell phone, SMS-based inventory query
- Identification: PC solution was overkill and costly

Outline

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A. Pentland, R. Fletcher, and A. Hasson, "DakNet: rethinking connectivity in developing nations," Computer, vol. 37, 2004, pp. 78-83.
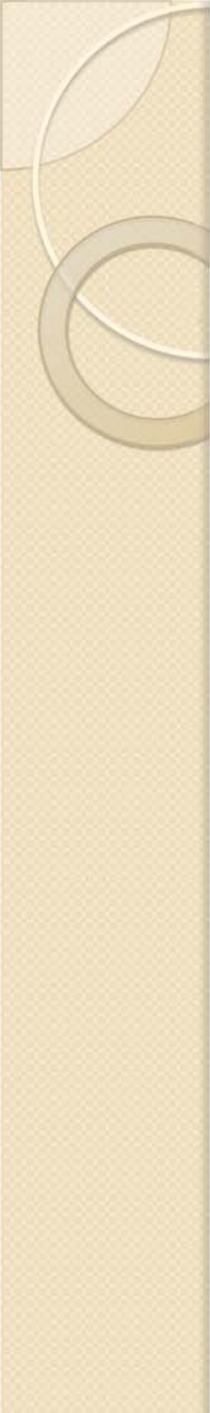
DakNet: Rethinking Connectivity in Developing Nations

- Researchers unsatisfied with ICT4D 1.0 projects
  - Telephones for every villages
    - "Who am I going to call?"
    - Landlines are expensive
- What about wireless technology?
  - High bandwidth
  - Ease of setup and use
  - Much cheaper than copper phone lines
    - Cheap commodity equipment
  - DNs can leapfrog over wireline telephony

# Insights: Asynchronous Communication

- Voice communication is synchronous
  - Both parties on the line at the same time
  - Disadvantage when using shared phones
  - Expensive (landlines)
- Asynchronous communication is popular in the developed world
  - Email
  - Voicemail
  - SMS
- Cost effective starting point for rural connectivity
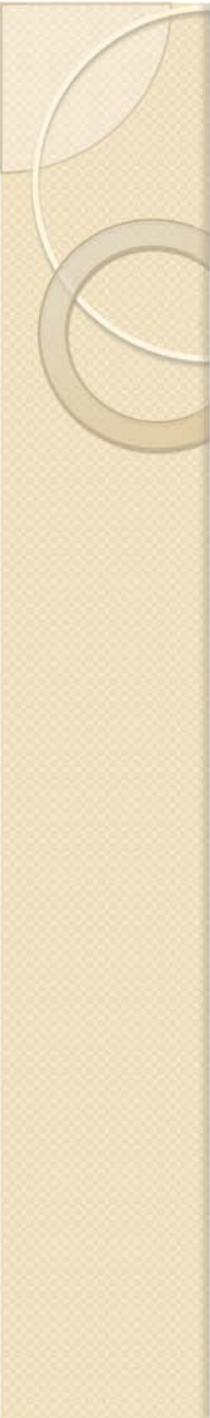
Insights: Services

- Villagers are willing to pay for digital services.

- Save them the time and much higher costs of poor transportation

- For government services, digital access could reduce corruption and unfair pricing.

- Start with a basic (seed) service and see how technology can support or streamline the service

DakNet – Mechanical Backhaul
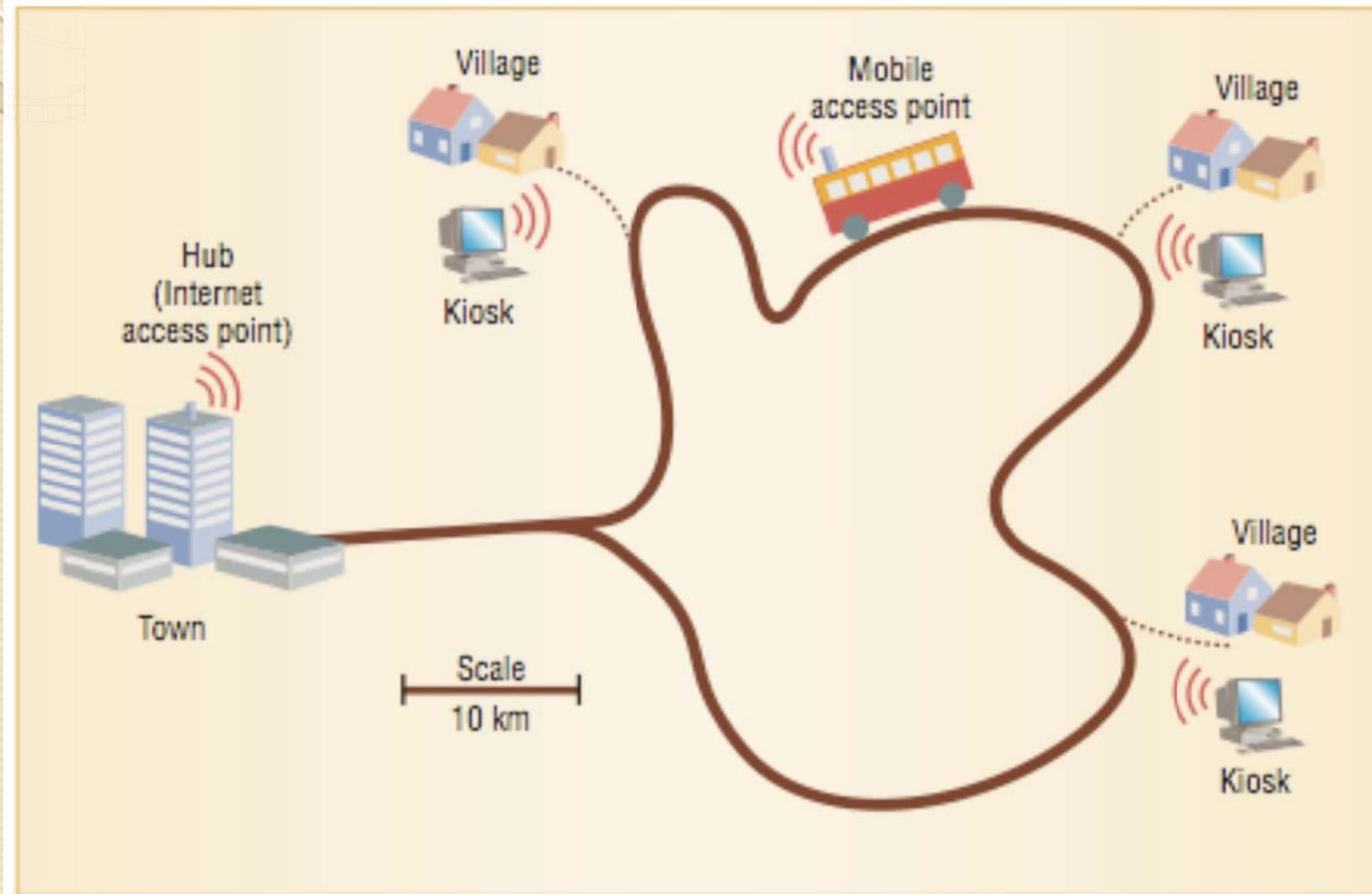
From Pentland, Fletcher, and Hassan. "DakNet: Rethinking Connectivity in Developing Nations."
IEEE Computer 37, no. 1 (2004): 78-83. Copyright © 2004 IEEE. Used with permission.
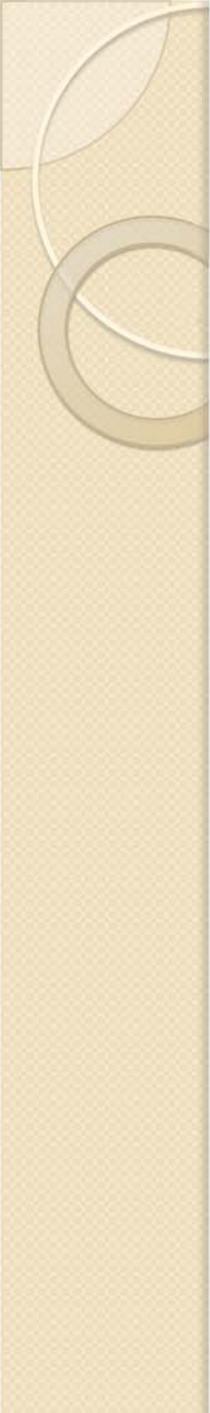
Example: Bhoomi Initiative in India

- Initiative to computerize land records
  - Kiosks set up in towns
  - Bus serves land records

- Costs (2004):
  - $580 for MAP bus (computer, amp, power supply)
  - $185 for village kiosk
  - 10 Villages = $243 per village

Discussion

- Will DakNet still have value as more villages get mobile service?

- What other services could be rolled-out using DakNet's model?

MAS.965 / 6.976 / EC.S06 NextLab I: Designing Mobile Technologies for the Next Billion Users
Fall 2008