What we will cover

- The digital divide
  - Developed World
  - Developing World
- One laptop per child program

Digital Divide

- The term *Digital Divide* refers to the fact that some groups of people have access to and regularly use computer, information and communication technology, while others do not
- The focus of the discussion about the digital divide has shifted over time as more people have access to technology
- In the 1990s the focus was on access to computers and the Internet for poor people, people in rural areas, and certain demographics in developed countries
- Now more focus on the digital divide between developed countries and poorer countries

Digital Divide – Developed World

- In 1994 a family in the US with a college graduate parent and family income over $50,000 was 5 times more likely to have a home computer and 10 times more likely to have a modem than the family of a non graduate earning less that $30,000
- Almost half the children of college graduates used the Internet at home compared with 17% of children of parents with high-school education
- Poor children and children of some ethnic minorities had less access to computers both at home and at school

Digital Divide – Developed World

- In the early 1990s only 10% of Internet users were women
  - By 1997, the gender gap had disappeared
- But other gaps remained
  - Black and Hispanic households were about half as likely as the general population to own a computer
  - Access in rural areas lagged behind the cities

Digital Divide – Developed World

- Digital divide in the developed world spurred many organizations who lobbied for "social equity"
- Advocates of universal access to the Internet said the human cost in joblessness, wasted potential and poverty could be high
- Governmental push towards free Internet access in schools, libraries, etc

Digital Divide – Developed World

- However the main reason for the decrease of the digital divide in developed countries seems to be related to cost
- Virtually all technological innovation is first available to the rich, where first purchases subsidize improvements in design and production techniques which bring the prices down
- This has been particularly true in the case of computers
- Computer prices plunged more dramatically than prices of other products, even while memory, speed and the variety of I/O devices and software was increasing dramatically

Digital Divide – Developed World

Earlier technologies	
Television	25
Radio	27
Telephone	35
Electricity	45
Automobiles	55
Computer-related technologies	
Personal computers	16
World Wide Web	7
Cell phones	13

Number of years to reach 25% of US households

Digital Divide – Developed World

- A second factor in the reduction of the digital divide was "ease-of-use"
  - E.g. Graphical user interfaces, point and click, mouse, Web browsers, search engines made computer use significantly easier
- In the developed world some people use terminology such as "haves" and have-laters" rather than "haves" and "have-nots"
- Finally, if a gap exists it seems that education and age are the primary demographic factors responsible for differences in Internet access – and not income, gender, ethnicity

The Global Digital Divide

- Approximately 1.9 billion people worldwide have access to the Internet
  - 800M use latin script
- Approximately 5 billion people do not
- However to put this into perspective:
  - Many of these 5 billion people and have little or no access to books
- Lack of access to the Internet in the world has the same causes as lack of telephones, healthcare and education
  - Poverty, isolation and politics

The Global Digital Divide

- Non profit organizations and big computer companies have ongoing projects to spread computer access to developing countries
- Catchphrase "*next billion users*" is used to address the population targeted by these projects
- For the companies, these programs create "goodwill" and if successful in improving the standard of living and economies of the target countries - a large future customer base

The Global Digital Divide

- Bringing new technology to poor countries is not simply a matter of money to buy standard equipment
  - PCs and laptops must work in extreme heat (or cold), extremes of humidity, dusty or rainy environments
  - Power requirements must be very low
  - Displays must be readable in bright sunlight

Developing world – mobile internet

- The Economist survey on Mobile phones in the developing world
  - "the single most transformative tool for development" (J. Sachs)
  - Fast penetration – eg Kenya: 38M people, 18M cellphones (2009)
  - Pre-paid
  - Information makes markets work, and markets improve welfare.
  - Outsourced network, infrastructure sharing, dynamic local pricing
  - Africa one of the leading innovators

Mobile internet

- Web of services
- By texting/SMS
- Pull of info (agriculture, health) from local experts
- Or push of info to subscribers (prices, weather)
- "These text based services, though they fall short of full internet access, have the potential to unlock a range of social and economic benefits to users of even the most basic mobile phones"

Mobile

- Early forms of mobile banking (airtime transfers)

- Cash → agent1 → account → agent2 → cash

- Ingenious uses in the recent revolts via self-made antennas and portable hubs (eee another Economist article)

One Laptop Per Child Project

- It is believed that Internet is used more often for information than communication

- This makes educational use of Internet particularly interesting in the developing world: One Laptop Per Child project `www.laptop.org`

- Not for profit organization created by faculty members of the MIT Media Lab with a goal of mass-production and delivery (NOT SALE!) of laptops to children in Asia, Africa, L. America

- Extremely interesting project

One Laptop Per Child Project

- Aim is to produce the "XO-1 $100 laptop"
- OLPC espouses five core principles:
  - child ownership;
  - low ages;
  - saturation;
  - connection;
  - free and open source.

One Laptop Per Child Project

- OLPC is funded by a number of sponsor organizations, including AMD, Brightstar Corporation, eBay, Google, Marvell, News Corporation, SES, Nortel Networks, and Red Hat

- Each company has donated two million dollars

One Laptop Per Child Project

- Organization gained much attention when Nicholas Negroponte and Kofi Annan unveiled a prototype in November 2005 at the World Summit on the Information Society

- Two prototypes: a non working physical model and a tethered version using an external board and separate keyboard. The device shown was a rough prototype using a standard development board

- The first working prototype was demonstrated in May 2006 and production actually began in November 2007

One Laptop Per Child Project

- Participating countries:
  - Africa
    - Rwanda (G1G1 pilot)
  - Americas
    - Haiti (G1G1 pilot)
    - Mexico (50,000 laptops)
    - Peru (270,000 laptops)
    - United States of America (15,000 laptops)
    - Uruguay (100,000 laptops)
  - Asia
    - Afghanistan (G1G1 pilot)
    - Cambodia (G1G1 pilot)
    - Mongolia (G1G1 pilot, now receiving 10,000 laptops)

    (G1G1 (Give 1 Get 1) Program)

One Laptop Per Child Project
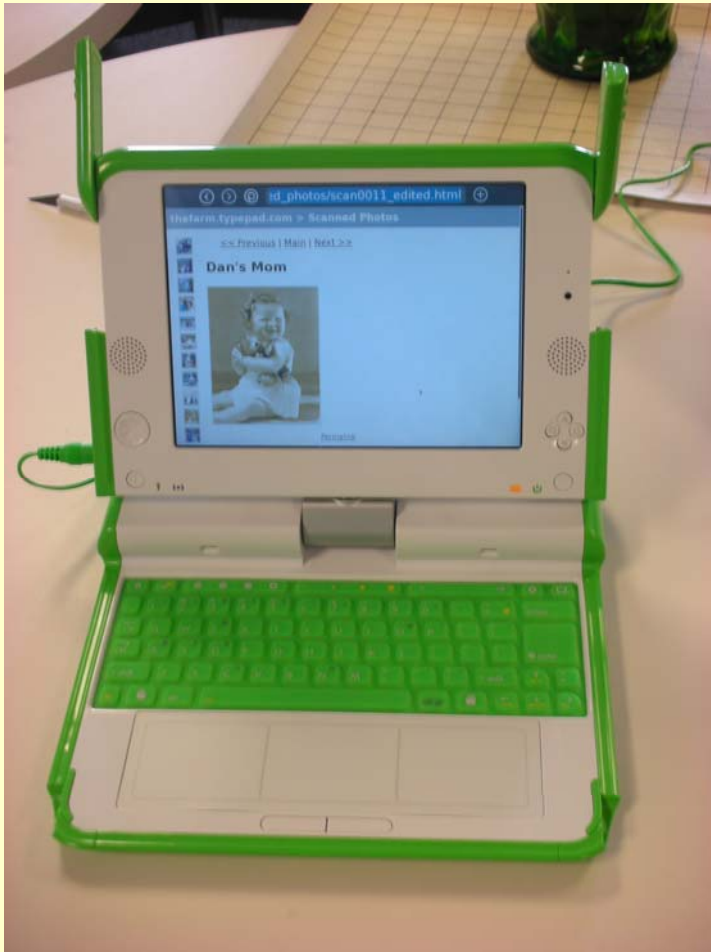
Main Features:

• No moving parts -> low power consumption

•Initially a crank to power on

•Wireless mesh networking – "clouds"

•Low-power LCD display – dual mode

•Pared-down version of Fedora Core Linux as the operating system, with students receiving root access

•A simple custom web browser based upon the Gecko engine used by Firefox, with a special version of the Opera web browser also in development.

•A word processor based upon AbiWord.

One Laptop Per Child Project

- Email through the web-based Gmail service.
- Chat and VOIP programs.
- Several interpreted programming languages, including Logo, JavaScript, Python, Csound, and the eToys version of Squeak
- A music sequencer
- A static copy of Wikipedia
- Audio and video player software: Mplayer or Helix.
- The laptop will use the Sugar graphical user interface, written in Python, on top of the X Window System.
- Criticized by Gates:
  - "geez, get a decent computer where you can actually read the text and you're not sitting there cranking the thing while you're trying to type."

Cambodian pilot project school

From OLPC wiki:

- Common criticism of the project is to say:
  - "What poor people need is food and shelter, not laptops." This comment, however, is ignorant of conditions in impoverished nations around the world. While it is true there are many people in the world who definitely need food and shelter, there are multitudes of people who live in rural or sub-urban areas and have plenty to eat and reasonable accommodations. What these people don't have is a decent shot at a good education."

OLPC in schools

- *Developing-countries educational problems*
  - Overpopulated classes
  - Schools lack appropriate infrastructure, particularly in rural areas
  - Substandard classrooms, lack of telephones, electricity
  - Very low teacher salaries, producing a flight of the higher intellectual levels to better-paid professions.
  - Non-professional teachers are used to teach subjects where a credentialed teacher is not available

OLPC in schools

- **Computer Uses in Education and their Benefits**
  - *Individualized interactivity* – More than just presentation tools unlike blackboards, television
  - *Computer-Assisted Learning -* The student learn by interacting with a program stored in the computer. This program is designed to react to the student's needs according to predetermined pedagogical criteria.
  - *Communication networks -* Students and teachers can communicate with their peers and access data banks in different parts of the country and around the world, in order to develop joint projects, exchange information, or request advice. Students, can research the topic by exploring the Internet for relevant information.

OLPC outside schools

- In Ghana, 53% of examined youth population went on-line to find health information
  - Internet even more important for out-of-school population for STDs, nutrition, fitness info.

In general:

- There are positive effects of computer tutoring applications in achievement tests
- Benefits of computer-base education are clearer for math and science
- Presence of computer at home is a strong predictor of academic success in math and science
  - 40 to 60 minutes per week of CAI in arithmetic sufficed to increase student progress by 121%
- Participation in a networked community of learners improves educational outcomes for at-risk children

Other social effects of Inet

- Fosters grouping and networking (combating dystopia) – eg Peuplade
- Promotes Sense of Community (SOC), eg in TCI (Transnational community of immigrants: dispersed group of people from the same nation who maintain a sense of togetherness across geo. borders)
  - Membership
  - Integration
  - Fulfillment: feeling that members' needs will be met by the resources received through the membership in the group
  - Influence
  - Shared emotional connection
- Internet allows for creation of *virtual online communities*: e.g. India Network and Haiti Global Village, and many many more

Conclusion

- The Internet and associated technologies is here to stay
  - How do we gauge and learn from the most useful aspects/developments so far?
  - What are the social consequences of Internet use?
  - How to "police" the Internet?
- Digital divide is decreasing with
  - Lowering of technology prices
  - Ease of use
  - Public free access
- Much more difficult in the developing world
  - Mobile phones vs network-connected computers