Swansea University
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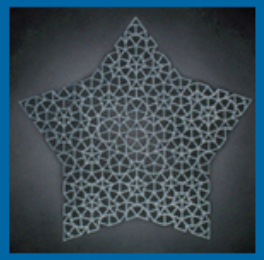
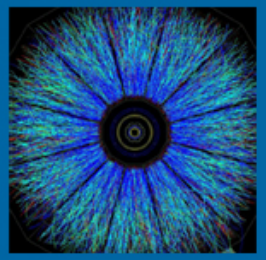
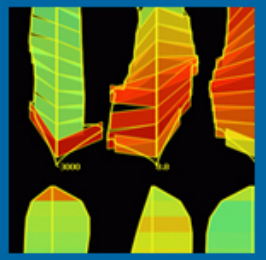
CS-130: Social Issues in Computing

Community and Computing: Computing in Developing Countries

Learning Goals

Who are Base of the Pyramid Users and why are they benefitting from digital technology?

What is the leapfrogging phenomenon?

What new approaches to education does computing technology enable?

Base of the Pyramid Users

Base of the Pyramid (BoP) Users are people living in developing countries who are just starting to get access to ICT innovations such as smartphones and data connectivity

- The term was coined to encourage investment and innovation because these people represent new markets

Developing Countries is a term applied to countries with less economically developed industrial bases and with lower Human-Development Index scores

- The term is somewhat arbitrary (how do we decide where to draw the line)
- Not everyone living in a developing country is a BoP user

Why Computing Has Started to Matter for BoP USers

Moore's Law – the number of transistors in a dense integrated circuit doubles about every two years which in turn means that costs and power consumption goes down

Increasing Wireless Connectivity – data connectivity costs for WiFi and cellular decrease as the infrastructure to support them continues to develop

Diffusions of technology – innovations in other places spread and are sometimes modified or appropriated by users in developing countries to suit their own unique needs

Leapfrogging

All these phenomena contribute to ***Technological Leapfrogging*** where what were considered incremental “stages” in a technologies deployment are skipped

- Examples include moving directly to mobile networks without developing a landline infrastructure
- Moving directly to solar power without ever developing a power grid
- E-banking through mobile phone credit sent via text messaging

Leapfrogging puts developing countries at the centre of innovation around the new technology potentially producing economic growth as well

What do BoP Users do with Technology?

Agricultural uses around crop growing and animal rearing

- Basic information about best agricultural practices can be enormously useful in of itself
- More advanced ideas like crop monitoring, soil quality measures and weather forecasting and long term planning

Access to healthcare at a distance called Telemedicine

- Rural communities struggle with basic healthcare access for consultations
- More advanced features I

Education

Education

The Romans introduced formal (fee paying) schools using methods adopted from the Greeks

- Boys and girls educated – not necessarily together
- Sons of rich men went to Athens

The European Dark Ages mainly had only practical education – fighting, hunting, farming

- The Church owned the only books – The Bible copied by hand
- Common people were not educated so very low rate of literacy
- Oxford University founded late 1100s

Learning Styles

"Tell me and I forget, teach me and I may remember, involve me and I learn."

- Benjamin Franklin

Good educational practice is to get students to engage in a variety of different forms of learning

- Old models of learner types (auditory, visual, kinesthetic) aren't real but they are a *useful lie* if you use them as a reminder to teach to all styles

Personalised Learning Environments (PLE)

One to many delivery or “broadcast” in the past has allowed many people access to education if they can devote time to reaching it

- However, if you fall behind you can’t be helped
- This creates an environment that penalises failure which is the opposite of what is needed to learn

PLEs are a potential solution to this as they allow people to learn at their own pace

- When someone struggles, allow them to keep practicing the skill they have trouble with
- But how do we do this if we only have 1 teacher and 40 or more children?

The future – Computer-Based Learning tools

Computer-Based Learning – Computers delivering education content to students in unique ways (games and computer based testing) in a monitored environment checking test results against “Knowledge Maps”

+ Creates a PLE
+ *Asynchronous learning* where everyone learns at their own pace
+ Reduced long term cost of delivery
+ Increased contact time?
+ Massive improvement for weaker students

- Decreased contact time?
- Cost of building the systems at the outset is high

The future - MOOCs

Massive Open Online Courses – Courses delivered using classical material via a website with final exams taken online and no requirement to attend in person

+ Allow institutes to deliver their teaching to a larger number of people
+ Convenient and allow people all over the world, including those living in developing countries, to access the education
+ Reduces the cost of delivery opening access to far wider range of people

- Face-to-face contact diminished
- Plagiarism is an enormous concern as it can diminish respect for the degree

Learning Goals

Who are Base of the Pyramid Users and why are they benefitting from digital technology?

People living in developing regions with historically low levels of access

What is the leapfrogging phenomenon?

Moving directly to the most developed level of a technology

What new approaches to education does computing technology enable?

MOOCs and CBL enable widely accessible PLE