ICTS IN EDUCATION STATISTICS
THE NEXT STEPS?

S I M O N E L L I S
U I S R E G I O N A L A D V I S O R F O R A S I A A N D T H E P A C I F I C
WHAT ARE WE TRYING TO MEASURE?

- Dissemination of new technology (MDG)
- Networking of schools (WSIS)
- Effects on test results
- Quality effects
GROWING GAPS?

OECD, EU and some middle income countries

- Complete broadband (on paper v. effective??) infrastructure
- Multiple devices in every home/pocket and on every desktop

Developing countries

- Mobile phones ubiquitous since 2002 when exponentially overtook fixed lines
- Some areas of some countries still lack electricity and a consistent bandwidth
- All countries have a successful pilot but few can afford a 100% roll out

- The growing gaps between countries can in itself be a major incentive for countries to seek to expand ICT provision
How has connectivity changed over time?

Internet Penetration by Percentage of Population (ASEAN Countries)

- Brunei Darussalem
- Singapore
- Malaysia
- Vietnam
- Philippines
- Thailand
- Indonesia
- Laos
- Cambodia
- Myanmar

2000 - 2011
INFRASTRUCTURE AND AVAILABILITY

- Necessary preconditions to use and thus need to be measured
- Many African schools still lack electricity
- Social barriers – gender and caste – may prevent those with theoretical access making full use of technology
  - Heads of household respond to survey for the whole household their responses may not reflect actual use patterns
PRINCIPLE OF ‘CHANNELS’

- One key objective for information societies is to give people access to the widest possible range of information for analysis/repackaging
- Technology is one of a number of delivery channels
  - Print (papers, posters, books), broadcast (radio, TV), telecoms (Internet, phone)
- Much information uses mixed channels
  - A newspaper copy is sent by internet and printed for local circulation
- People need skills for using/evaluating multiple channel content
- UNESCO promoting combined media and information literacy skills
THE THREE LEVELS OF MEASUREMENT

1. Infrastructure
   ▪ Numbers of machines
   ▪ Installed networks

2. Availability
   ▪ How much time in the week spent on net

3. Use (information literacy)
   ▪ Recognise information needs
   ▪ Locate and evaluate quality of information
   ▪ Store and retrieve information
   ▪ Make effective and ethical use of information
   ▪ Apply information to create and communicate knowledge

Other use
   ▪ Effective use of images, sound recordings
   ▪ Media literacy
FINANCIAL CONSIDERATIONS

- ICTs are a proportionately smaller cost for households/schools in OECD countries.
- All developing countries have conducted a feasibility study, often in a rich school in the capital.
- Growing numbers of countries in Asia and the Pacific have an ICT Master Plan that lead to a managed expansion of ICT in schools.

BUT

- A major national rollout in a developing country requires large funding which has to be justified.
- Many cost factors (e.g. maintenance, upgrade, teacher training) need to be taken into account.
- The financial justification must be simple and clear-cut to stand up to public scrutiny.
IMPACT ON LEARNING

Two major determinants of learning are:
- Mothers level of education
- IQ

PISA shows a varying effect of ICT use on learning:
  - (some studies in OECD countries even show negative impact)

....with greater impact if PC is available at home than at school

Risky to try and justify a major ICT roll out on the basis of improved learning
Average difference in points on PISA maths achievement scale between students with access to a computer and those without.

Source: New Millennium Learners. OECD 2006.
NETWORKING BETWEEN SCHOOLS

WSIS target to ‘network every school’

Do pupils have their own email accounts?
Use of communications tools like blogs, message boards etc
Expansion of broadband
OTHER IMPACTS?

Norwegian ‘multilevel’ approach
Requires simple proxies for complex educational processes
Could assess pupils use of
  ▪ Wide range of applications
  ▪ Embedding of images and sound within assignments
  ▪ Breadth of sources used in assignments
  ▪ Complexity of technical operations eg spreadsheet manipulation

ICTs are seen as a potential major instrument for improving effectiveness and efficiency in education management. How to measure?

Many countries are concerned about negative impacts of ICT; spam, pornography, violence etc. How to measure?
MULTIPLE DEVICES + ACCELERATING TECH

*SMS* – literacy for mobile phones, also numeracy with phone banking

*Smart Phones* – GPS and the geography lesson

*Laptops* – spreadsheets, business apps

*Tablets* – Thailand ‘a tablet for every child’

Where next?? *PCs* to be consigned to a museum??

**Statistical development requires**
- Specification of definitions and indicators
- International agreement
- Successful implementation in range of countries over a number of years

Before a true international standard can be said to exist, and UIS can begin regular global data collection
SMART PHONES

GPS and geography

Education on the move?

- Nokia EDN Papua allows headmasters to monitor school attendance on their phone

Korean Internet and Wireless Surveys 2010

9% of Internet users used a mobile phone for banking (12% used a Notebook)
9% of Internet users used a mobile phone for stock trading (11% used a Notebook)
10% of Smartphone users used it for education/study
TABLETS

The key findings emerging from the case studies were that Tablet PCs:

- needed to be used in conjunction with a wireless network
- needed to be introduced in a planned way that took full account of the school's vision, as well as of the technical infrastructure, support and staff development, and day-to-day management issues
- increased the amount of ICT use and the degree of integration of ICT across the curriculum
- at some schools were used effectively to replace an ICT suite and thus free up space
- increased motivation, and hence were likely to have a positive impact on learning outcomes
- supported moves to more independent and collaborative study
- used with a wireless data projector, provided a better solution than a desktop or laptop and hardwired interactive whiteboard
- were seen as being more versatile than laptops, although the higher price of Tablet PCs relative to similarly specified laptops was prohibitive.

BECTA (2005)
3D IN EDUCATION

In 3D pupils

- were more likely to use gestures or body language when describing concepts
- had better ordering (sequence) and greater knowledge of learning concepts
- had enhanced skills in describing their learning including writing more, saying more and being more likely to use models to show learning
- 86% of pupils improved from the pre-test to the post-test, compared to only 52% in the 2D classes.
- teachers encouraged more conversation and collaboration with pupils during the 3D lessons

Int Research Agency & Texas Instruments (2011)
CONCLUSIONS

- Still need to know about electricity and infrastructure in schools in developing countries
  - Easy to collect through EMIS, easy to evaluate
- Need to strengthen indicators on usage and skills
  - Continuing problem of measuring content and usage. Possible in study of individual school but near impossible at national level.
- How to justify major finance in developing country context?
  - Currently a political commitment rather than evidence-based
- How to measure delivery across mixed ‘channels’?
- Future adaptations
  - Measuring the impact of multiple devices