

# KNOWLEDGE MAP: COSTS

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## GUIDING QUESTIONS:

- What is known about the cost of using ICTs in education?
- What is known about costing and budgeting for ICT use in education?
- What is known about the costs of ICT-enhanced distance learning?

## CURRENT KNOWLEDGE BASE

*What we know, what we believe –  
and what we don't*

### *General*

- **Little is known about the true costs of ICTs in education**

Few good, rigorous cost studies of ICTs in education exist in LDCs (and surprisingly few in OECD countries as well).

- **Even less is known about cost effectiveness, especially in LDCs**

Even fewer studies of cost-effectiveness of ICT in education initiatives in LDCs exist.

- **Opportunity costs under-studied as well**

Little research exists into opportunity costs related to ICT in education investments – this is especially relevant, and problematic, given the resource scarcities that define many LDCs seeking to meet education-related MDGs.

- **ICTs seen as playing a useful role in many LDCs by driving efficiencies in the sector as a whole**

It may be that the most cost effective uses of ICTs to benefit education in LDCs at this time – at least in the near term – may be in their roles to improve organizational and systemic efficiencies (including use as tools to combat corruption in the education sector).

- **Widespread roll-out of ICTs in education in LDCs generally felt to be too expensive**

Given existing resources constraints and lack of adequate supporting technical, commercial and human infrastructure, widespread, ubiquitous uses of ICTs in education are not believed to be currently possible in most LDCs.

- **More compelling evidence for use at secondary, tertiary and higher education levels**

For cost reasons alone, UNESCO has concluded that, in many countries it is probably unrealistic to consider deploying computers in primary schools. At secondary level, where there may be strong



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curricular arguments for some investment, this is likely to make for significant increases in total educational expenditure if it is to allow students more than rare and occasional access to computers.

- **Computers in schools may be most cost-effective when placed in common areas**

The few available cost figures suggest that many countries may want to deploy computers in school libraries, in teacher-training institutions and perhaps in community telecentres (although these may possibly be school-based), but stop short of seeking to do so in every classroom.

- **Best treatment of cost issues was published in 2001**

The best general examination of relative costs of ICT initiatives to help realize education-related MDGs can be found in *Applying New Technologies and Cost-Effective Delivery Systems in Basic Education*; published in 2001, it remains little improved upon today.

### *Distance education*

- **Economies of scale are available in distance education, but have large up-front costs**

Economies of scale are achievable in distance education investments; such investments typically require large up-front costs (which may make them good candidates for donor support).

- **There is compelling evidence for use of distance education in teacher training**

Teacher professional development has been shown to be less costly when delivered through distance education.

- **Cost per graduate may be much higher than cost per participant**

Given higher drop-out rates associated with some distance learning initiatives, costs per graduate may be much higher than cost per learner.

- **Distance education provides opportunity for cost shifting**

Distance education often allows some costs to be shifted from the public sector onto participants/learners themselves (and/or their communities). While this reduces public expenditure, it may give rise to equity issues.

### *Total Cost of Ownership (TCO)*

- **TCO is typically underestimated in planning exercises**

“Total cost of ownership” (TCO) is often underestimated, sometimes grossly, when calculating costs of ICT in education initiatives. Estimates of initial costs to overall costs vary widely, typically they lie between 10-25% of total cost.

- **TCO toolkits exist in OECD countries**

TCO toolkits for education exist, based on circumstances in OECD countries. Little evidence exists of their use in LDC environments.

- **On-going recurrent costs are under-studied**

Little research exists regarding on-going recurrent costs over time of ICT in education initiatives in LDCs.

- **There are real costs associated with successful planning for these types of initiatives**

Costs of planning for ICT use in education are often overlooked or underestimated, but are essential.

- **Training costs are not uniform**

Training costs of both end users and those involved in infrastructure maintenance related to ICT in education investments in LDCs vary quite widely.

- **Different types of costs vary over time**

Hardware costs typically decrease, often quite dramatically, over time. Software costs are typically quite low as a percentage of overall investment, and remain so over time. Maintenance and training costs vary greatly, and typically do not decrease over time.

- **Lack of guidance on how to conduct TCO studies**

In addition to lack of data, there is a lack of case studies and toolkits on how to conduct TCO and cost effectiveness research. Where such case studies and toolkits exist, they have largely been designed for corporate settings and/or for OECD circumstances.

## Internet

### ■ Internet connectivity costs vary tremendously

Costs related to the provision of Internet connectivity appear to vary greatly, both between and within countries, and depend on a wide variety of factors, including existence of existing delivery infrastructure, nature of Internet provider (public/private/monopoly), and the nature of Internet technology (dial-up, lease line, ADSL, cable, satellite, wireless).

### ■ e-Rates can improve access

“E-rates”, or special national/regional tariffs for Internet access by schools, have been shown to increase Internet access in OECD countries, although resulting cost data may not be relevant to LDCs environments.

## Costs associated with specific types of ICTs

### ■ Radio may be the most cost-effective form of ICT

Interactive radio instruction (IRI) has been shown to offer significant cost savings in some circumstances. Computers are seen to be much more costly (up to ten times more expensive), as is television.

### ■ Cost savings from open source and thin client solutions are (as yet) unproven

Many claims about cost savings from the use of “open source” software and “thin client solutions”) in education have been made, but little reliable and/or persuasive hard cost data exist to support such assertions.

### ■ Donated and refurbished equipment can carry significant costs

The use of donated computer equipment contains many hidden costs that may make their usage more expensive over time than the purchase of new equipment.

### ■ ICT-related costs often viewed on a marginal cost basis in OECD countries

Use of ICTs in education is often treated on a marginal cost basis, with quality/impact gains possible as ICTs supplement/complement existing programs.

## Financing mechanisms

### ■ Financing mechanisms are varied

Financing mechanisms for ICT in education initiatives are quite varied. Due to the high up-front costs and large recurrent costs, countries and communities typically employ a great variety of financing and cost recovery mechanisms.

### ■ Costs savings from public-private partnerships are unclear

Public-private partnerships are seen as an important component of financing mechanisms for ICT in education initiatives, although little research has been done in this area.

### ■ Cost recovery at user level is attractive, but problematic

Cost recovery at the user level is seen as an important tool to finance and maintain ICT in education initiatives, although many barriers (legal, regulatory, administrative, cultural, and equity) exist complicating attempts at cost recovery.

## COMMENTS

### General comments

- Much work needs to be done related to the costs of ICT in education investments.
- The lack of reliable cost data in virtually all areas is quite striking.
- Given the lack of reliable cost data, the lack of reliable cost effectiveness studies should come as little surprise.

### Applicability to LDC/EFA context

- Before large scale investments in ICTs to benefit education and to help meet education-related MDGs, much more work needs to be done on the cost issue.
- The relevance of existing cost data related generated in OECD countries related to ICT use in education in OECD countries is questionable for many reasons. *For example:* While labor costs in general are

typically lower in LDCs, labor costs in LDCs related to the ICT sector may be much higher compared to other costs in the education sector. In addition, hardware costs may in many cases be higher in LDCs than in OECD countries, due to important restrictions, customs, taxes, less competition among vendors, etc.

- Toolkits, based on OECD experience, exist to help in measuring costs of ICT use in education, but do not appear to have been widely used in LDC contexts.

### Some areas for further investigation and research

- Significant work needs to be done related to the costs of ICT in education initiatives in LDCs. All of the claims listed above found in current literature deserve additional scrutiny. Most cost studies neglect to ask perhaps the most fundamental question: Can you reach the same educational goals and objectives in a different manner at less cost *without using ICTs*?
- What is the Total Cost of Ownership (TCO) for computers in a variety of educational settings, at both the school and system level? How should we calculate such figures?
- What are the costs/benefits of situating ICTs for use in schools outside of computer classroom?
- How can public-private partnerships be used to 'cut costs' and what are the resulting cost savings (if any)?

### Some Recommended Resources

to learn more ....

- *A Chance to Learn: Knowledge and Finance for Education in Sub-Saharan Africa* [World Bank 2001]
- *Applying New Technologies and Cost-Effective Delivery Systems in Basic Education. World Education Forum Education For All 2000 Assessment* [Perraton 2001]
- *Computers in secondary schools in developing countries: An analysis of costs* [Cawthera 2001]
- *Cost analysis of information technology projects in education: experiences from developing countries. Measuring and managing the costs of ICTs in Latin American schools* [Potashnik 1996]
- *The Costs of Computers in Classrooms Data from Developing Countries* [Bakia 2000]
- *Enhancing Learning Opportunities in Africa: Distance Education and Communication Technologies for Learning* [Murphy 2002]
- *Fighting Corruption To Improve Schooling: Evidence From a Newspaper Campaign In Uganda* [Reinikka 2004]
- *Financing of Education in East Asia: EFA and beyond* [Rose 2002]
- *Sustainability Challenge - Taking EdTech to the Next Level* [EDC 2003]
- *Taking TCO to the Classroom* [COSN 2000]
- *Teacher Education through Distance Learning: Technology, Curriculum, Evaluation and Cost* [UNESCO 2001]
- *Total cost of ownership (TCO): A review of the literature* [Scrimshaw 2003]
- *The True Cost of Ownership* [McKenzie 2003]

### About these Briefing Sheets:

*infoDev's* Knowledge Maps on ICTs in education are intended to serve as quick snapshots of what the research literature reveals in a number of key areas. They are not meant to be an exhaustive catalog of everything that is known (or has been debated) about the use of ICTs in education in a particular topic; rather, taken together they are an attempt to summarize and give shape to a very large body of knowledge and to highlight certain issues in a format quickly accessible to busy policymakers. The *infoDev* knowledge mapping exercise is meant to identify key general assertions and gaps in the knowledge base of what is known about the use of ICTs in education, especially as such knowledge may relate to the education-related Millennium Development Goals (MDGs).