

People and Technology in World Class Education Systems

News, perspectives and challenges
from developing countries

Michael Trucano
Sr. ICT & Education Specialist
The World Bank

EMINENT
Rome, Italy
4 December 2008

drawing on

**Lessons from the World Bank
and the
International Donor Community**

**What we know
and what we don't
about using technology
in education
in developing countries**

What we know
and what we don't
about using technology
effectively
in education
in developing countries

**(and how might this be
relevant for Europe)**

?

“I believe that the **Internet is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks. It is possible to touch every branch of human knowledge through the **Internet**. “**

I believe that the **motion picture** is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks. It is possible to touch every branch of human knowledge through the **motion picture**.

-- Thomas Edison 1922

ICTs in Education

ICTS

radio

computers

=

information

TV

&

Internet

communication

phones

technologies

devices



photo opportunities



or

**strategic choices
for education reform**

?

Michael Trucano
Sr. ICT & Education Specialist
The World Bank

**helping the World Bank
education sector and
international donor community**

and

‘client countries’

“Get smart”

@

appropriate

relevant

effective

and, just as importantly...

inappropriate

irrelevant

ineffective

uses of technologies

**to aid a variety of
developmental objectives
in the education sector**

What is the **World Bank**?

a global development institution
owned by > 180 member countries with:

- significant financial resources
- an experienced, knowledgeable, and dedicated staff
- convening power
- experts in more than 100 countries.

What does the **World Bank** do?

Assist developing countries
to help themselves
by catalyzing financing and policies
through a blend of ideas and experience,
development of private sector opportunities,
and support for good governance –
spurred by the Bank's financial resources.
(loans, grants, technical assistance,
knowledge products)

today's challenge:

Sustainable Globalization

Help countries overcome poverty and spur sustainable growth, with care for the environment, to create opportunity and hope.

- Target the poorest countries, and the bottom billion in post-conflict states
- Help middle-income countries grow sustainably and equitably
- Develop public goods to promote growth and human development
- Serve the world as a unique institution of knowledge creation and dissemination of lessons for development

World Bank Lending for Education

Five decades of education support

	FY63-69	FY70-79	FY80-89	FY90-99	FY00-06*
<i>By Expenditure Category</i>					
Infrastructure (Civil works)	82%	47%	29%	26%	27%
<i>By education Level:</i>					
Primary Education	3%	14%	19%	46%	53%
Secondary Education	52%	20%	9%	13%	21%
Technical & Vocational Education	25%	34%	28%	10%	4%
Tertiary Education	20%	32%	44%	31%	22%

Notes: New lending codes by education level introduced in FY03. Codes capture data from FY90.

* Projects supporting more than one level of education or those such as lifelong learning that do not fit well into one of the categories.

What we do

- Work with countries
 - Sector Work (AAA)
 - Project/Program Preparation
 - Project/Program Supervision
 - Evaluation
- Work on global knowledge
 - Research (Pure and Applied)
 - Training Staff
 - Training Clients
 - Partnerships

What we do

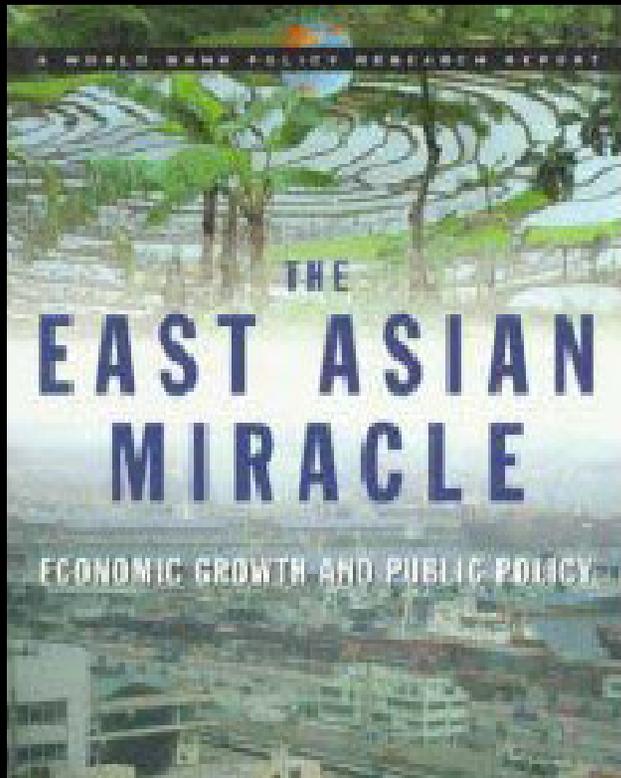
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Why the **World Bank**
cares about **education**

Education Policy Determines Economic Outcomes

- Increases Productivity and Earnings
- Reduces Poverty and Income Inequality
- Accelerates Economic Growth & Prosperity

Global Relevance of the East Asia Miracle



- **Exponential & sustained economic growth**
- **Getting & maintaining fundamentals right**
- **Sustained accumulation of human capital:**
 - Education & economic policies juxtaposed and aligned
 - Education system, integrated, diverse and comprehensive
 - Focus on equity and quality
 - Education & values endogenous,
 - 1993 economic linkages exogenous

Ghana & South Korea

1960

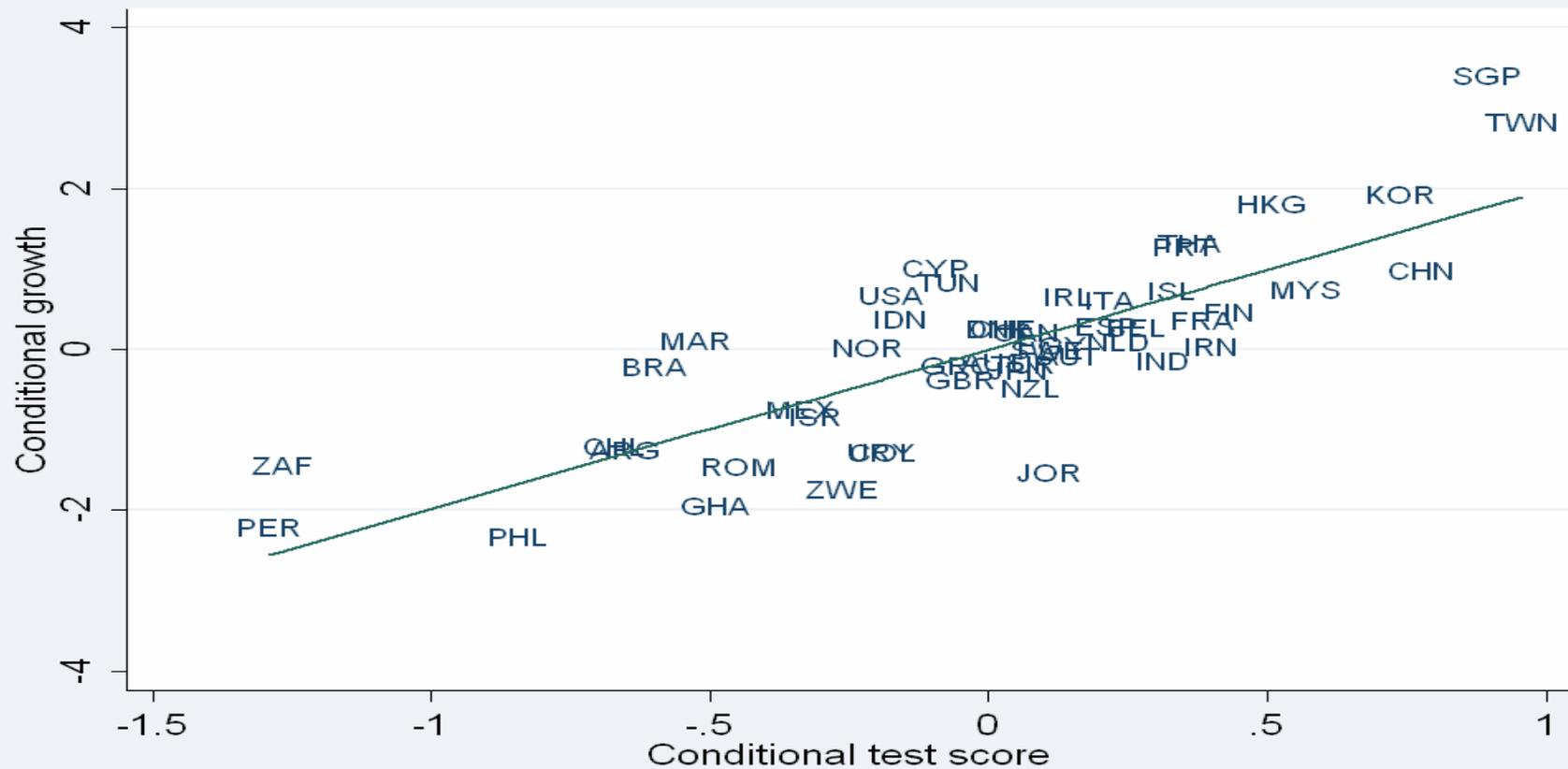
Economic Miracle: Korea

	1962	1970	1980	1990	1995	1998	2003	2006
GNI (Billion US\$)	2.4	8.2	62.7	263.5	515.5	340.4	608.6	887.3
GNI per capita (US\$)	90.9	254	1,645	6,147	11,432	7,355	12,717	18,372
Unemployment Rate(%)	7.1 (1966)	4.4	5.2	2.4	2.1	7.0	3.6	3.5
Youth Unemployment Rate (%)	-	-	-	5.4 (1991)	4.6	12.2	8.0	7.9

Korean Educational Development Stages

Focus by Periods	1948~1960 Reconstruction	1961~1980 Ed for Eco. Growth	1981~2000 Search for New Paradigm of Educational Development	2001 ~Present Restructuring
Challenges to Education	<ul style="list-style-type: none"> • Compulsory Education 	<ul style="list-style-type: none"> • Secondary Education for All • Supply for Technical manpower 	<ul style="list-style-type: none"> • Universalization of Higher Education 	<ul style="list-style-type: none"> • Lifelong learning • HRD
Major Concerns	<ul style="list-style-type: none"> • Access to Opportunity 	<ul style="list-style-type: none"> • Growth of Quantity, Efficiency and control 	<ul style="list-style-type: none"> • Quality • Autonomy • Accountability 	<ul style="list-style-type: none"> • Competitiveness in Globalization knowledge-society
Policy Choice	<ul style="list-style-type: none"> • Universal compulsory education • Reconstruction of educational infrastructure 	<ul style="list-style-type: none"> • Expansion and Equalization of secondary education • Technical Vocational education & training 	<ul style="list-style-type: none"> • Decentralized local autonomy of Education • Expansion of Higher Education • Quality Improvement 	<ul style="list-style-type: none"> • Restructuring Higher Education <ul style="list-style-type: none"> – Support Research productivity – Regional development – HRD, L-L • Quality improvement of Public schools • Coordinated approach to HRD
Resources or Tools	<ul style="list-style-type: none"> • Using Foreign Assistance 	<ul style="list-style-type: none"> • 5 Years planning long-term planning • Law of Local education financing fund established • Foreign loans to support TVET 	<ul style="list-style-type: none"> • PCER: Presidential Commission for Education Reform • Education Reform (1995) 	<ul style="list-style-type: none"> • Educational and Financial Support for Higher Education (BK, Nuri, Post BK)

Achievement: Learning Outcomes and Economic Growth



coef = 1.9804387, se = .21707105, t = 9.12

Where should the **World Bank**
focus its attention?

Support basic education for all?

Focus on secondary and higher education, too?

Develop ways for countries to achieve higher learning outcomes?

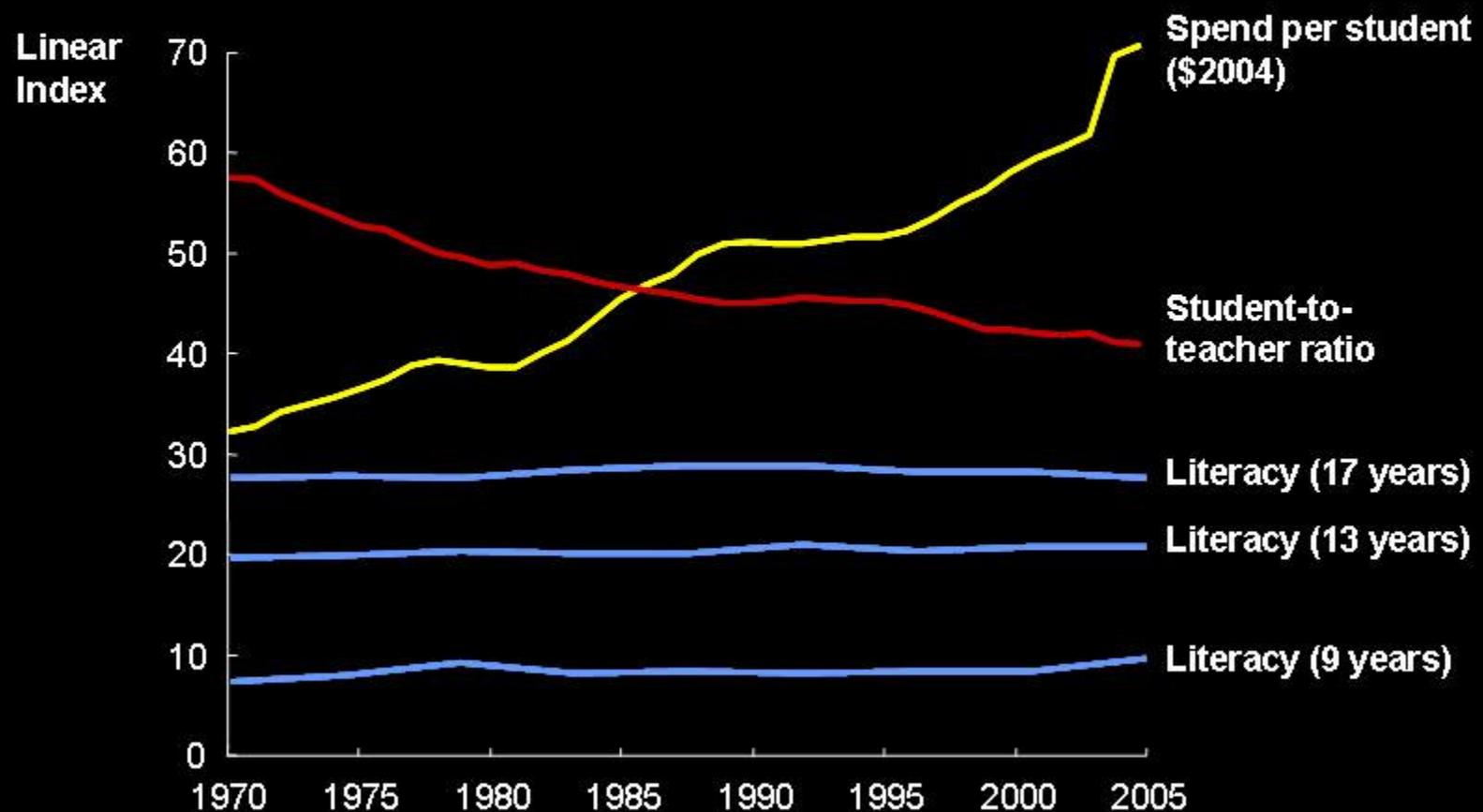
Equity versus Quality?

What's a Country to Do?

yes

The state of education: quality

- Increased funding alone is not the answer



Source: National Centre for Education Statistics, NEAP, Hanushek (1998), McKinsey

Key World Bank Priority Areas for Global Knowledge Products

- **Learning for All**
 - Evidence base on what works to improve learning outcomes
 - Measurement of learning outcomes
 - Access, quality, equity – (i) education in fragile states, (ii) school health & HIV/AIDS and education (iii) gender and education
 - EFA/FTI – managing the Bank's role in FTI
- **Skills and Knowledge for Growth and Competitiveness**
 - Development of Education Quality Global Index
 - Tools for effective school to work transition
 - Post Basic Education to improve development of skills for competitive economies
 - Stimulating growth through Science, Technology & Innovation
- **Education Systems for Results**
 - Evidence base on improving governance & transparency in education system
 - Public Private Partnerships
 - Education financing

- Learning for All

- Evidence base on what works to improve learning outcomes
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- Skills and Knowledge for Growth and Competitiveness

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- Education Systems for Results

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Information and communication technologies

Information and communication technologies

Information and communication technologies

tools to help meet
specific challenges

not

ends in themselves

ICT use in education

Three basic questions

one What are the good models and lessons that we can learn from? (*and*: What should we avoid?)

two What is the impact?
(*and*: How do we measure impact?)

three What does all of this cost?
(*and*: How do we measure the
costs related to ICT use?)

Knowledge Maps

Impact

M&E

Equity

Costs

Projects & practices

Tools

Teachers and pedagogies

Content & curriculum

Policy

School-level

based on

**regular primary and secondary
literature review**

(1800+ documents)

**intensive review of
> 125 World Bank education projects**

Turkey - Second Basic Education Project

Mali - Education Sector Expenditure Program Project

Peru - Rural Education Project

Azerbaijani - Education Sector Development Project

Jordan - Education Reform for Knowledge Economy

Vanuatu - Second Education Project

Bhutan - Education Development Project

Armenia - Education Quality and Relevance Project

Tunisia - Education Quality Improvement Program (EQP II)

Chad - Education Sector Reform Project

Russia - E-Learning Support Project

**regular interviews with
World Bank education task
managers and government
officials and partner
organizations**

research initiatives

ICT Components in World Bank education projects

Monitoring & Evaluation of ICT in Education Initiatives

ICTs and Teacher Professional Development

**Education Management Information Systems:
Case Studies and Lessons Learned**

**Policymakers Toolkit
(with UNESCO)**

**Surveys: ICTs in
Education in Africa &
the Caribbean**

**M&E of NEPAD e-Schools
low-cost devices**

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M&E of NEPAD e-Schools

low-cost devices

**global knowledgebase,
with key partners**

key findings

a. impact

**impact of ICT use on learning outcomes
and future employment is unclear,
and open to much debate**

**absence of widely accepted standard methodologies
and indicators to assess impact**

**disconnect between the rationales most often put
forward to advance the use of ICTs in education and
their actual implementation**

**very little useful data on the cost of ICT in
education initiatives,
especially those attempting to assess
Total Cost of Operation/Ownership,
nor guidance on how to conduct cost
assessments.**

b. costs

ICTs are being increasingly used
in education,
even in the most challenging
environments in developing countries

c. use

for better

AND

for worse

why?

and to what end?

World Bank experience

While much of the rhetoric (and rationale) for using ICTs to benefit education has focused on ICTs' potential for bringing about changes in the teaching-learning paradigm, and to develop work force skills, in practice, ICTs have been most often used in WB education projects to date to aid in the development of education management information systems (EMIS) and to equip and train MOE and PIU staff.

Less often, such components help support existing teaching and learning practices with new (and, it should be noted, often quite expensive!) tools.

in other words

INFRASTRUCTURE

but this is changing!

New Economy Skills for Africa – ICT

[NESAP-ICT]

d. lessons learned and best practice

emerging best practices and lessons learned in a number of areas, but with a few exceptions (notably on 'schoolnet' development and general lessons learned),

they have not been widely disseminated

nor packaged into formats easily accessible to policy makers in developing countries,

and have not been explicitly examined in the context of the education-related MDGs

if this is the case

why **are we** investing in them?

why **should we** be investing in them?

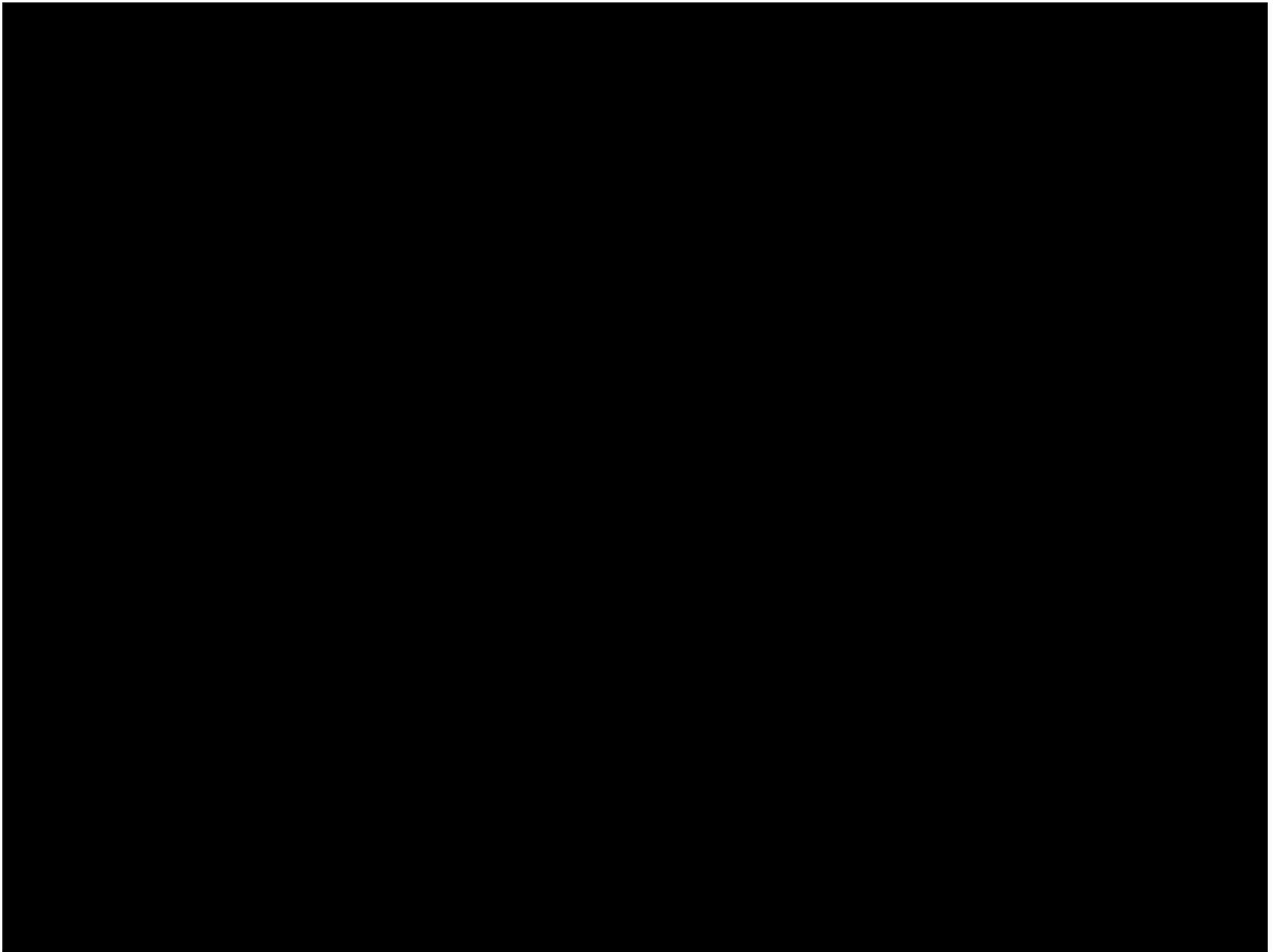
Do they help

make schools more **productive and efficient** than they currently are?

transform teaching and learning into an engaging and active process connected to real life?

prepare the current generation of young people for the **future workplace**?

how do we know?



undeniable

the daunting challenges of EFA

EFA

Education **F**or **A**ll

Millennium Development Goals

2015

The Strategic Challenge

- **Educational Attainment & Achievement Gap**
 - **Universal Primary Education** – 58 out of 86 countries will not achieve UPE by 2015
 - **Least Developed Countries** - the population averages 5.25 years of schooling
 - **Developed countries** - the population averages 9.80 years of schooling
 - **Gender** – out of the 72 million primary school-aged children out of school, 41 million are girls; Only 18 out of 113 that missed the gender parity goal in 2005 will achieve it by 2015
 - **Indigenous People** – In Latin America, Indigenous people continue to have fewer years of education and education outcomes are substantially worse for indigenous peoples.
 - **Living in Fragile States** – over 50% of out-of-school age children live in fragile and conflict affected states
 - **The Skills & Innovation Gap** – it is difficult for students to efficiently compete and reap benefits of today's global economy
 - Results from **PISA** show that in low income countries almost half (43%) of students performed on or below the lowest level of performance while only 17% of high-income country students performing on or at the lowest level.

**countries struggling to meet EFA
targets do not need ICTs**

books

and

blackboards

and

latrines

“SILENT EMERGENCY!”

**massive numbers of teachers
are needed**

poorest of the poor

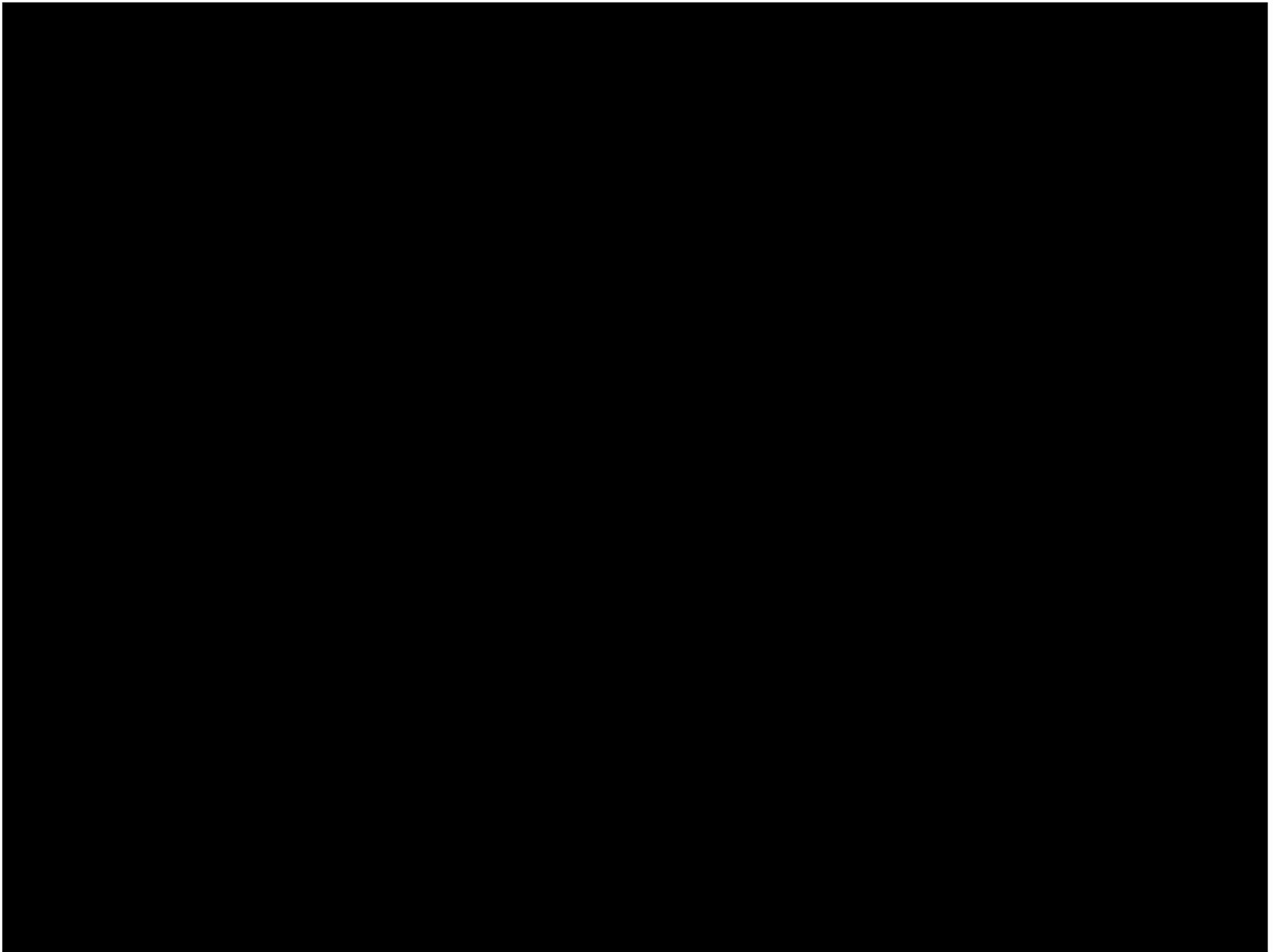
increasing demand from client countries

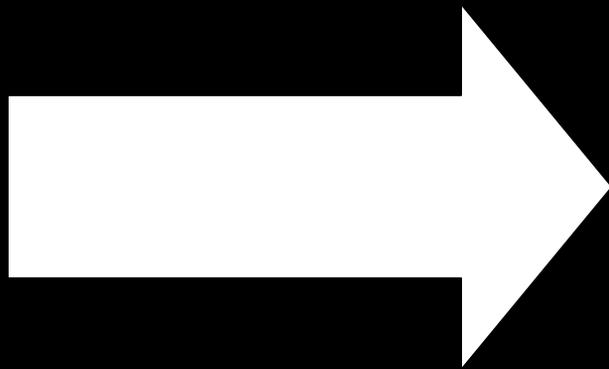
middle income

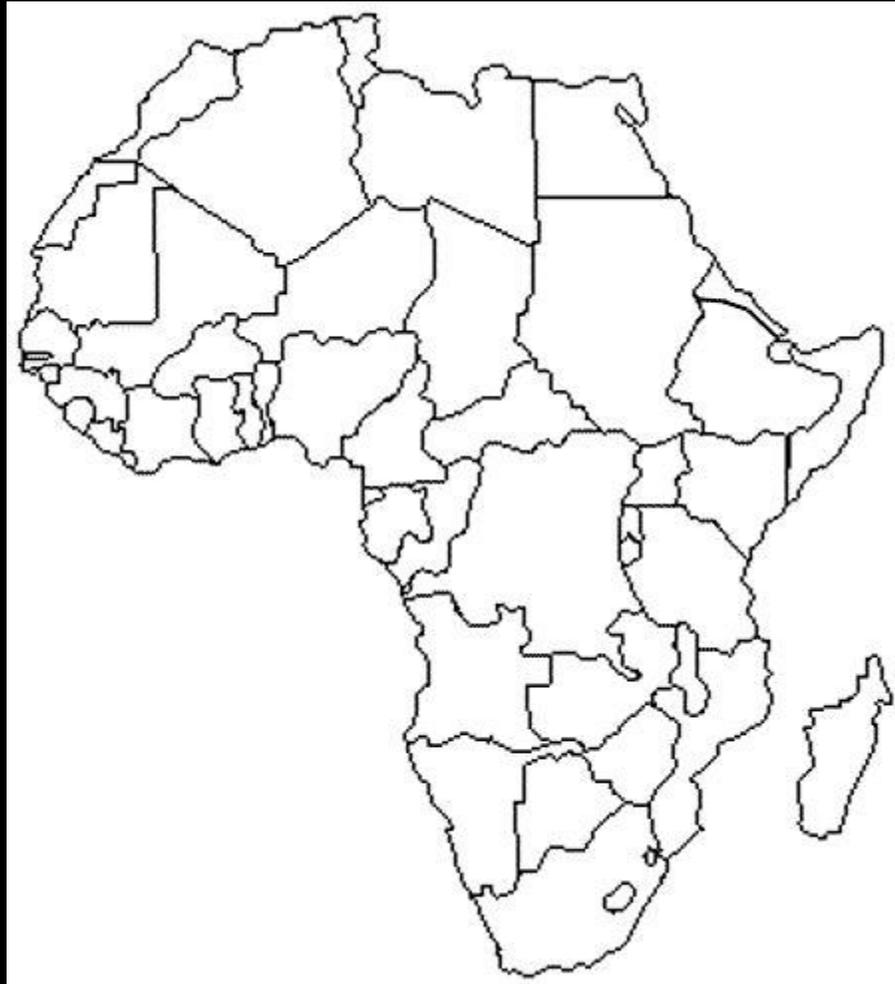
- and -

low income

**existing tools and mechanisms
are not enough**







Despite

widespread beliefs that ICTs can be important potential levers to introduce and sustain education reform efforts in Africa

anecdotal evidence of increasingly widespread demand for and use of ICTs in education initiatives in African countries

demonstrated interest from African policymakers in using ICTs to help meet Education For All (EFA) and other objectives

scattered and often uncoordinated initiatives utilizing ICTs to benefit education throughout the continent

much rhetoric related to the 'digital divide'

no consolidated documentation of what is actually happening in Africa in this area

no comprehensive baseline data on the state of ICT use in education in Africa against which future developments can be compared.

why

why

should

why

should

we

why

should

we

care

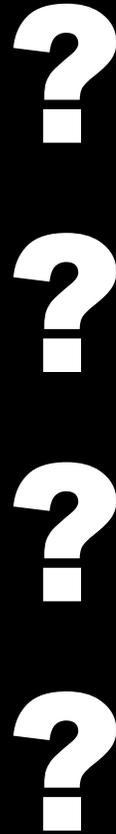
?

?

?

?

A
Lack
Of
Information
Impacts
Planning



A
Need
For
Coordination

Donors
Governments
Private sector
Civil society

"We recognize that while ICT may be a luxury for the rich, for us the poor countries, it is a vital and essential tool for fighting poverty -- for beating poverty that kills -- and ensuring our survival."

*Meles Zenawi
Ethiopia*

"ICTs are seen as one key solution that will allow Africa countries to meet the needs in rural and under-served areas and bring education to their citizens rapidly and cost efficiently."

Communiqué, first African ministerial round table on ICT for education, training, and development (June 2007)

"It has become abundantly clear to us in Africa that ICT is an indispensable tool in the achievement of our development outcomes. We do not have the luxury of waiting until the necessary conditions are in place."

***Paul Kagame
President of Rwanda***

"Experts have observed that the learning styles of the youth today have changed.

It is important that teachers adapt their teaching pedagogies to suit current learning styles of their students".

***President John Agyekum Kufuor
Ghana***

new models of ICT use

(relevance for Europe?)

What has changed?

PRICES

PRICES

PRICES

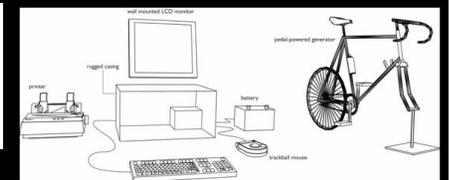
PRICES

(magic price: \$100)



**but this is about
more than the OLPC XO**

Some low cost



ICT user devices



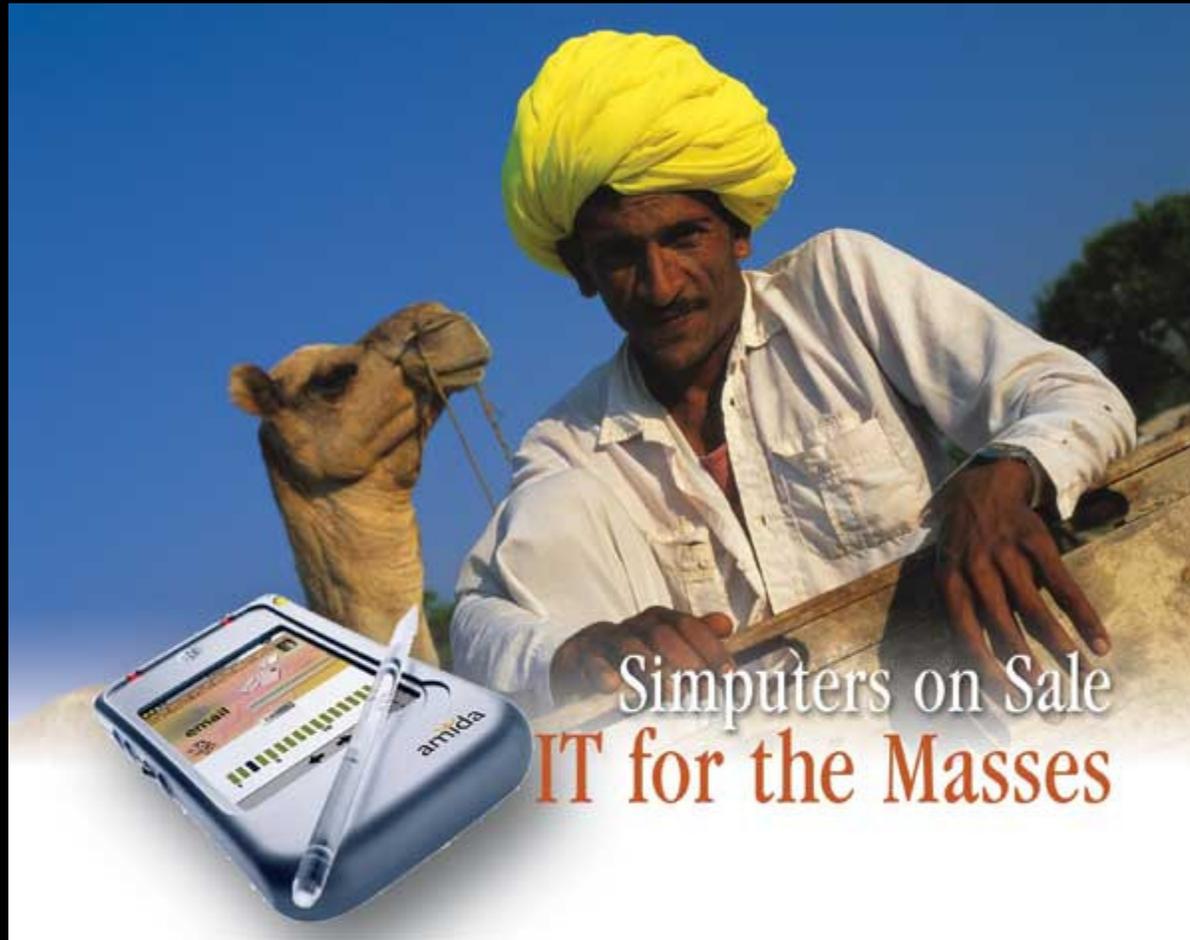
liliputing.com

Asus Eee
Dreambook Light IL1
Everex Cloudbook
HO Mini-Note
ECS G10IL
MSI Wind
Surcouf La Révolution
2Go PC
3k Longitude
ACi Ultra-mini
Airis Kira
Deep Blue
Elonex One
Fukato Datacask
HCL MiLeap X
Jisus
Kohjinsha SCC
Medion Akoya Mini
Noahpad

liliputing.com



low-cost ICT devices in the education sector



Simputers on Sale
IT for the Masses

2005

2006

renewed explosion of
interest

2007

in providing low-cost
computing 'devices' to
consumers in developing
countries

2008

Devices?

Devices?

laptops

Devices?

laptops

mobile phones

Devices?

laptops

PDA's

mobile phones

Devices?

laptops

and things in between

PDA's

mobile phones

Alphasmart (Neo, Dana)

AMD Personal Internet Communicator

Computador Popular (Popular PC)

Cowboy

Desert PC

E-DUC Projeto Caderno Digital ("digital notebook")

EELS (EduVision E-Learning System)

FonePlus

Fulong Mini-PC (also known as "Longmeng", "Lemote Box", "Loongson Box")

HP 441

Ink PC

Intel Classmate / Eduwise

Intel Community PC

Inveneo

iT (ATM1088(L))

Jhai PC

Janata

Mobilis and SofComp

Municator

Nova Net PC & Nova Net TV

Ndiyo!

OfficeStation (PC Expansion)

One Laptop Per Child

PCtv

Simputer

Sinomanic

SolarLite PC

Solo

Terra/PHD

VillagePDA

the *infoDev* quick guide

Government-sponsored

Cheap PC programs

Programa miPC (Argentina)

PC Conectado & Computador Para Todos (Brazil)

Gyanotkarsh, Gyanjyoti (India)

PC Gemilang (Malaysia)

the Computers for All Nigerians Initiative (CANi)

People's PC Program (Philippines)

the Saudi Arabian Home Computing Initiative (SAHCI)

People's PC project (Thailand)

Thanh Giong (Vietnam)

some related initiatives

Emerging Market Handset Programme

Information Technology Access For Everyone
(ITAFE)

NEPAD e-Schools

Project Inkwell

some related corporate initiatives

AMD's 50x15

Cisco's LDC

Intel's World Ahead

Microsoft's Unlimited Potential

Qualcomm's Wireless Reach

Via's PC-1

HP's e-inclusion (defunct)

CanTV

Bushmail

Computer On A Stick (COS)

e-Granary Digital Library

Freedom Toaster

Internet Village Motoman

Ioband

Samurai

Whizzy Digital Courier

Some observations

Some observations

- Designing for cost not features

Some observations

- Mobile phones
- Designing for cost not features



phones = call + talk

phones \neq call + talk





Photo: Rikin Gandhi



receive calls

flash/beep

send and receive SMS

address book

calculator

flashlight

music player

three models of ICT adoption

**computers/Internet before mobile
phones**

**computers/Internet at the same time
as mobile phones**

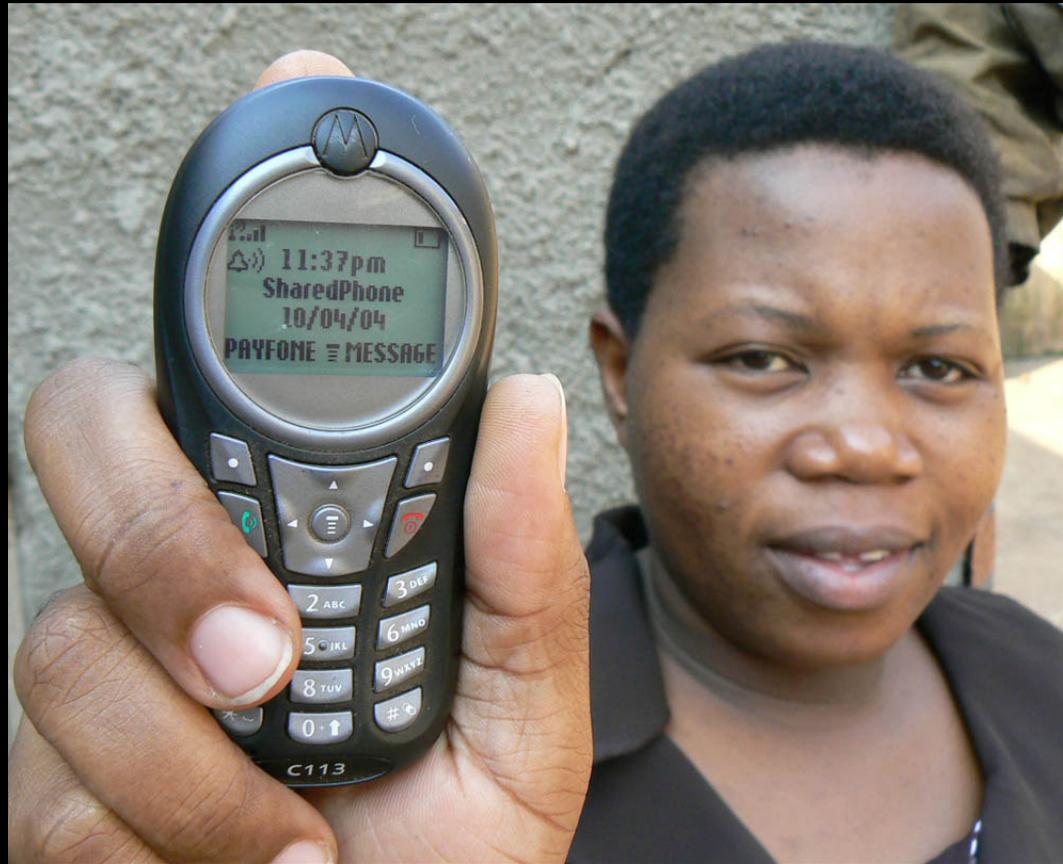
**mobile phones before
computer/Internet**

“The future is
already here,

it’s just
unevenly distributed.”

-William Gibson

innovation is coming from
developing countries



shared device

Some observations

- Re-imagining
- Mobile phones
- Designing for cost not features

low bandwidth

no bandwidth





transformation

or

business as usual?

does it matter?

Today's ICT products and services in the education sector have been largely born of OECD experience, and targeted at OECD markets.

What if this changes?

Some observations

- Developing countries
- Re-imagining
- Mobile phones
- Designing for cost not features

**secondary
student
population**

**secondary
student
population**

**secondary
student
population**

**secondary
student
population**

sustained GDP growth

***impact of this year's
economic crisis***

(corporate) mindsets

innovations in marketing

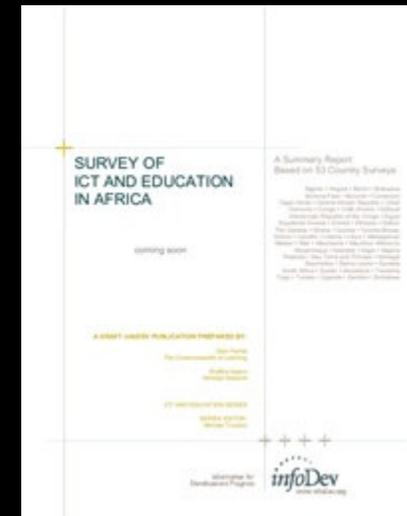
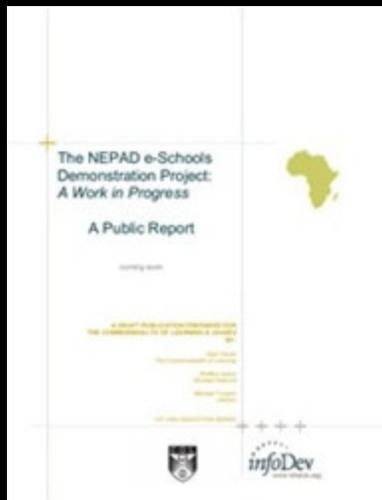
Some observations

- Open source
- Developing countries
- Re-imagining
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Some observations

- Technology projects
- Open source
- Developing countries
- Re-imagining
- Mobile phones
- Designing for cost not features

Survey of ICT and Education in Africa



M&E of NEPAD e-Schools

Survey of ICT and Education in Africa

Contents of the Summary Report

ICT Policies for Education

ICT Infrastructure for Education

ICT Activities and Initiatives in Higher Education

ICT Activities and Initiatives
in Primary and Secondary Schools

ICT Activities and Initiatives in Non-formal Education in Africa

Gender Equity

Factors Enabling and Constraining ICT Use in Education

Survey of ICT and Education in Africa

53 country reports

- illustrative, **not** exhaustive •
- “snapshots” that were current at the time they were taken (early 2007) •
 - new developments and announcements happening on a daily basis somewhere on the continent •
 - a starting point •

some **key** findings

ICTs are being increasingly used
in education,
even in the most challenging
environments in developing countries

source:

Knowledge Maps (*infoDev* 2005)

Survey of ICT and Education in Africa (*infoDev/COL*, 2007)

Critical Review and Survey of ICT and Education in the Caribbean (*infoDev* 2007)

different places, different speeds

North Africa

ICT

different places, different speeds

emerging

* South Africa

conflict

* North Africa

ICT

different places, different speeds

emerging

South Africa

conflict

North Africa

* ICT

different places, different speeds

emerging

South Africa

conflict

North Africa

ICT

different places, different speeds

* emerging

South Africa

conflict

North Africa

ICT

different places, different speeds

emerging

South Africa

*** conflict**

NGOs and private sector leading the way

Africa:

Over 250 organizations active in ICT in education
Major corporate initiatives

source:

Survey of ICT and Education in Africa (*infoDev/COL*, 2007)

The NEPAD e-Schools Demonstration Project: A Public Report (*infoDev/COL*, 2007)

A New Phase: From Pilot Projects to Policies

Africa:
48 countries have policy in place or under development

source:
Survey of ICT and Education in Africa (*infoDev/COL*, 2007)

Increasing demand from client countries

Africa:
middle AND low income countries

source:
The NEPAD e-Schools Demonstration Project: A Public Report (*infoDev/COL*, 2007)
ICT in Education Toolkit usage requests
Discussions with donor staff

for better

AND

for worse

(enlightened) Leadership

bottom's up developments
complemented by *top-down* interest

source:
Survey of ICT and Education in Africa (*infoDev/COL*, 2007)

Enabling and Limiting Factors

Infrastructure and access

Policy framework and implementation

Advocacy leadership

Gender equity

Collaborating mechanisms

Fiscal resources

Learning content

Attitudes

source:

Survey of ICT and Education in Africa (*infoDev/COL*, 2007)

Connectivity:

“too little,
too expensive,
and poorly managed”

source:

African Tertiary Institution Connectivity Survey (ATICS), 2005

Macro Trends

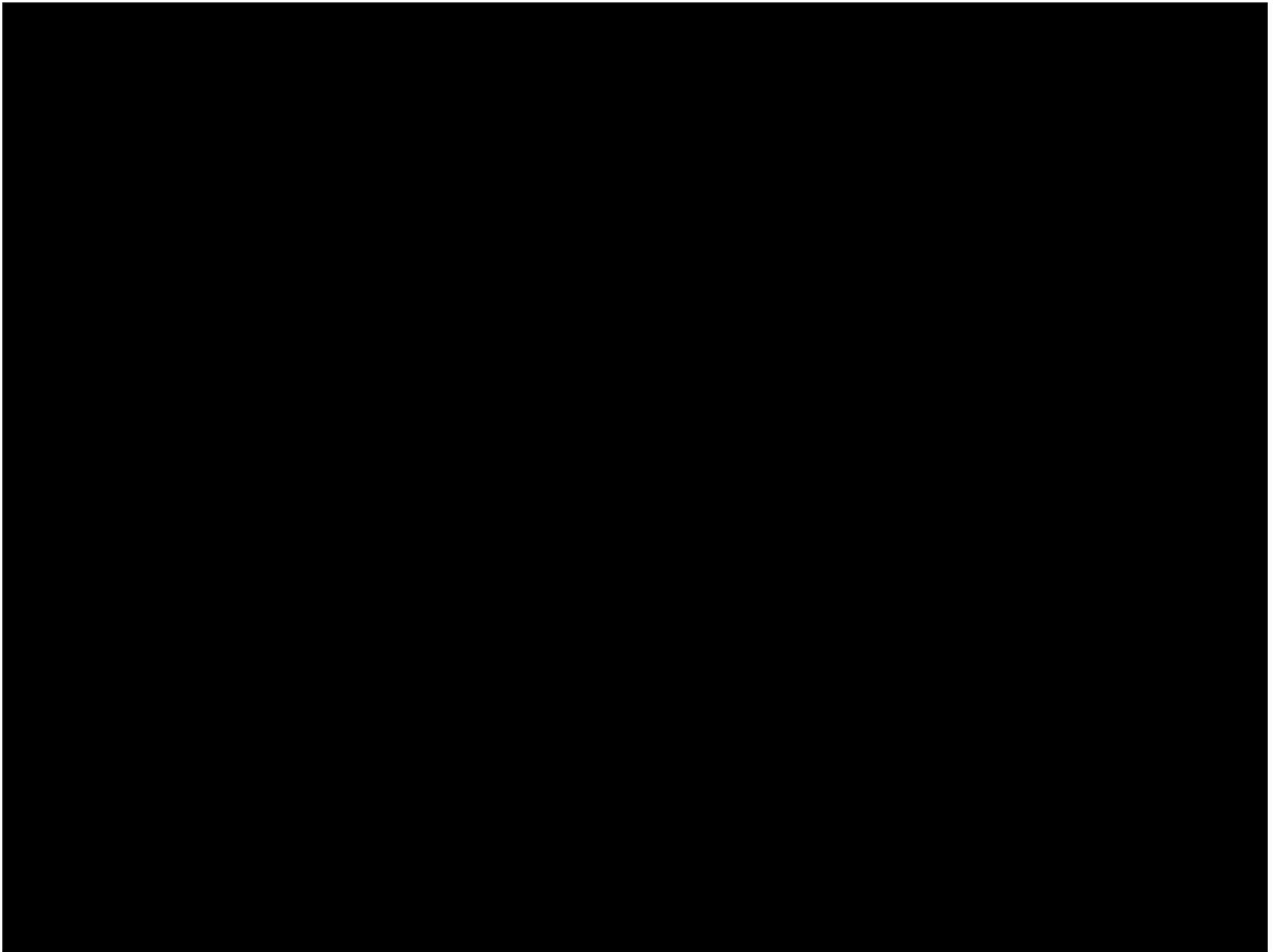
Public-Private Partnerships
Digital Content Development
Open Source Software and Operating Systems
Regional Initiatives
National Research and Education Networks (NRENs)
International Connectivity
Wireless Networks

source:
Survey of ICT and Education in Africa (*infoDev/COL*, 2007)

Donor involvement

funding for initial pilots
regional initiatives
national ICT infrastructure plans
bilateral aid to support educational institutions

source:
Survey of ICT and Education in Africa (*infoDev/COL*, 2007)



policy implications

General

- There is general agreement on the most important issues and best/worst practices
- Introducing ICTs raises important equity issues
- Changes and innovations in technology come much faster than changes in the education system

access

quality

Existing policies

- Different parts of government are responsible for ICT in education policies in different countries
- There is no database of existing policies
- Successful policy requires consultation with a diverse group of stakeholders

Scaling up

- Little is documented about the 'scaling up' of ICT in education initiatives in LDCs
- Models for scaling up are quite varied
- Schoolnets are a useful tool

Reform, organizational, management and efficiency issues

- ICTs can be important drivers for educational reform
- ICTs can help in anti-corruption efforts in the education sector
- ICTs can aid decentralization
- ICTs are vital for data collection and analysis

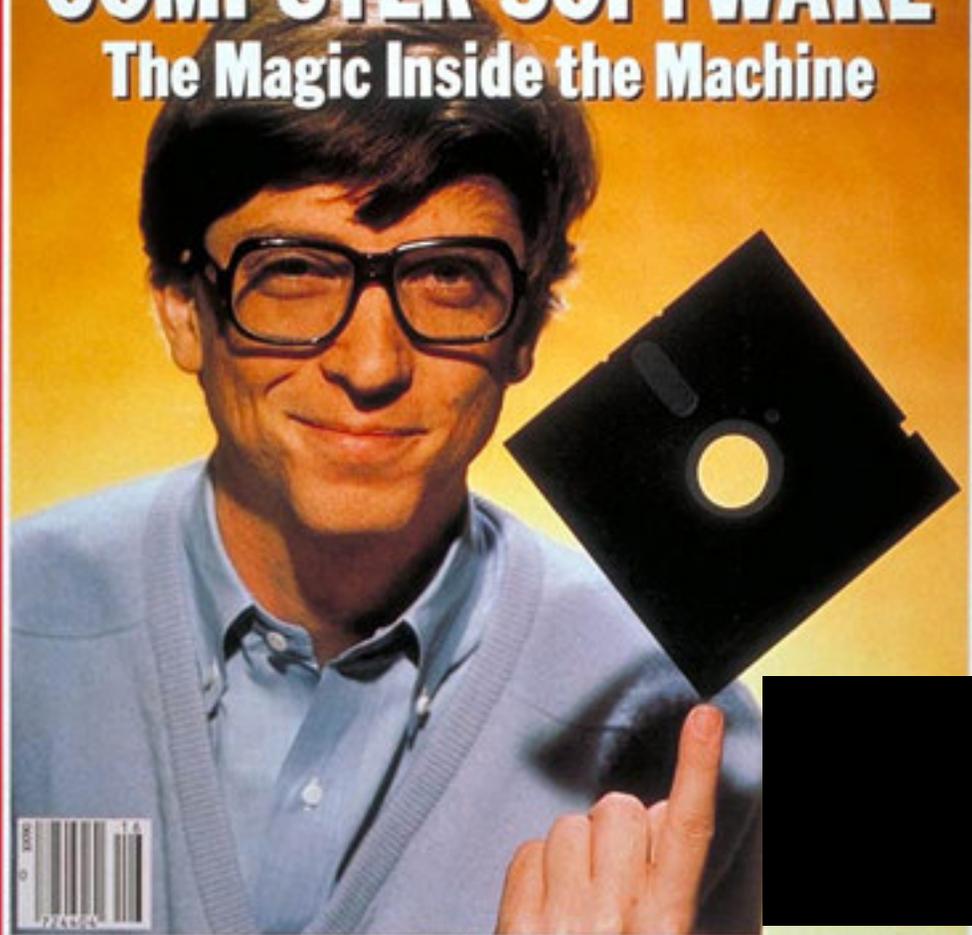
APRIL 16, 1984

\$1.75

TIME

COMPUTER SOFTWARE

The Magic Inside the Machine



MONDALE'S BIG MOMENT
How He Conquered
New York



watch **these countries**

watch **India**

watch **Brazil**

watch **Nigeria**

watch **China**

Let's unpack things a little ...

What factors and impulses lie behind decisions to explore, purchase and roll-out ____?

Is it ...

Novelty?

Desperation?

Aspiration?

Imitation?

Demand?

Supply?

Cost?

People?

Imagination ... Or lack of it?

How might our answers to such questions impact the way we think about education?

re-play

Will (how can) ICTs help

make schools more **productive and efficient** than they currently are?

transform teaching and learning into an engaging and active process connected to real life?

prepare the current generation of young people for the **future workplace**?

Innovation needed at either end of development continuum

EDUCATION

Bottom 1 Billion – IDA

40+ fragile states

Critical EDU Issues:

Social cohesion

Reconstruction

Top 500 Million – Top IBRD

Critical Issues:

Knowledge economy,
competitiveness, labor markets

EQUALITY

EQUITY

EFFICIENCY

Partnership & collaboration?

Knowledge products
-> learning from the European experience

Global and regional workshops for policymakers
(ICT & education, with the Korean government)

Partnerships with MOEs and schoolnet initiatives
in developing countries

Technical assistance

more information:

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additional info + photo credits

www.infodev.org/devices

[www.worldbank.org/
education/ict](http://www.worldbank.org/education/ict)

www.olpc.org

www.NComputing.com

classmatePC.com

OLPCnews.com

liliputing.com

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jonathandonner.com

- Ken Banks
kiwanja.net

- Jan Chipchase / Nokia
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- MobileActive
mobileactive.org

- Tino Kreutzer
tinokreutzer.org/mobile