ICT in Education:
Policy Questions and Lessons Learned

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Outline

I. Introduction

II. Key Policy Questions

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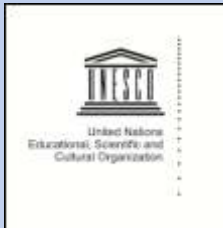
I. Introduction:

1. Notable Trends
2. Definition of ICT in Education
3. Scope of ICT in Education



1.1 ICT and the World of Work

Computerization and job task content within occupations

	1977	1984	1991	Examples
Complex Communication	2.94	3.57	4.02	Eliciting critical information and conveying a convincing interpretation of it to others
Expert Thinking	5.70	5.86	7.08	Identifying and solving new problems
Routine Cognitive	-18.18	-16.56	-18.48	Filing, Bookkeeping
Routine Manual	1.74	0.83	0.37	Assembly line work

(Values are OLS regression of ten times annual change in the occupational task measure)

Source: Murnane, et. al. (2003)

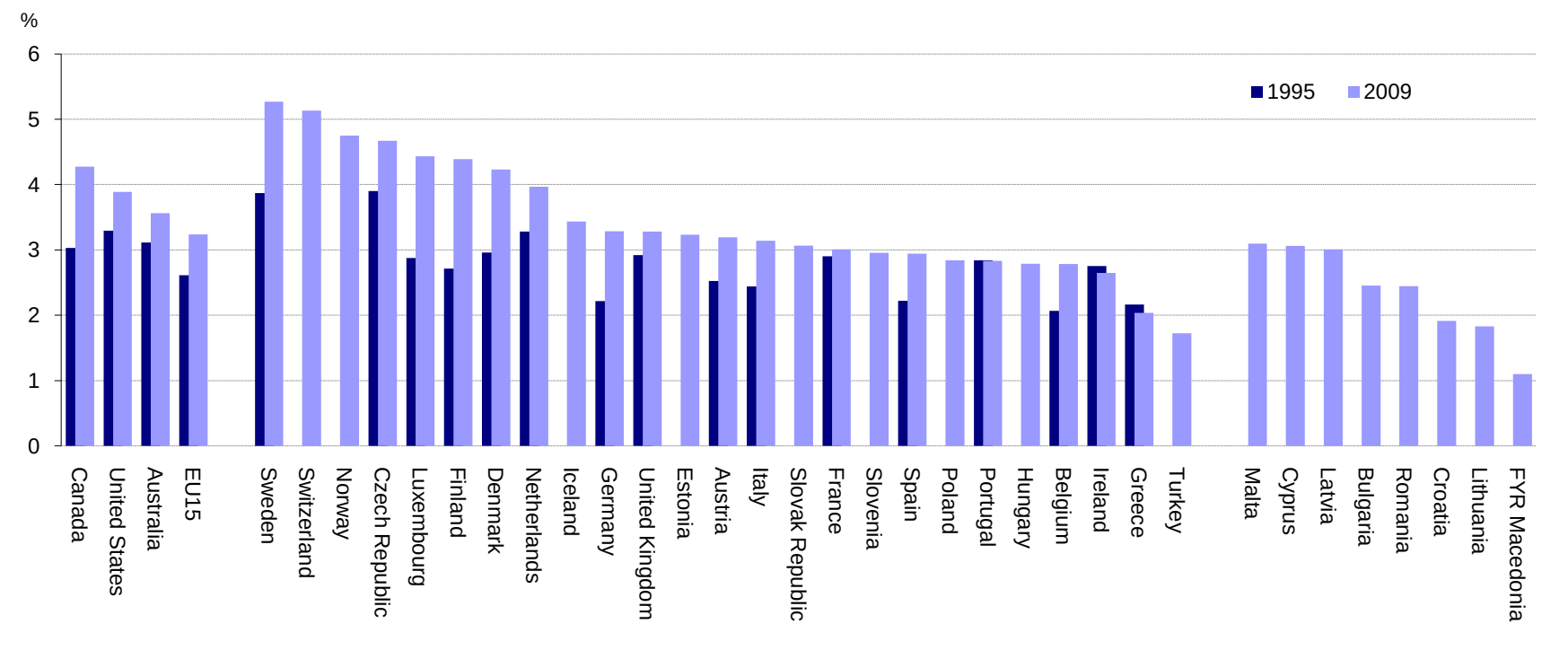
1.2 Wage Premium Associated with ICT Skills

Author	Country		Wage Impact (% increase over non-user)
Krueger 1993	United States	1983	15.0
		1989	18.0
Boozer, Krueger and Wolkon 1992	United States		22-23
Hamilton 1997	United States		13-25
Handel 1999	United States		7
Krashinsky 2000	United States		0
Borland, Hirschberg and Lye 1999	Australia		10-18
Miller and Mulvey 1997	Australia		10-15
Reilly 1995	Canada		15.5
Morrissette and Drolet 1998	Canada		14
Entorf and Kramarz 1997	France		2-10
Entorf and Kramarz 1998	France		2-20
Entorf, Gollac and Kramarz 1999	France		1-18
Asplund 1997	Finland	1987	8.4
		1989	8.1
		1991	6.4
		1993	0
Dinardo and Pischke 1997	Germany		17
Haisken-DeNew and Schmidt 1999	Germany		1-7
Oosterbeek 1997	Netherlands		11
Arabsheibani, Emami and Marin 1996	United Kingdom		20-23
Arabsheibani and Marin 2000	United Kingdom		19
Bell 1996	United Kingdom		13
Green 1998	United Kingdom		13-18
Borghans and Ter Weel 2000a	United Kingdom		21
Sakellariou and Patrinos 2000	Vietnam		10-14

Source: Chris N. Sakellariou & Harry A. Patrinos (2003), Technology, Computers, and Wages: Evidence from a Developing Economy

1.3 ICT-specialist Users in the Total Economy

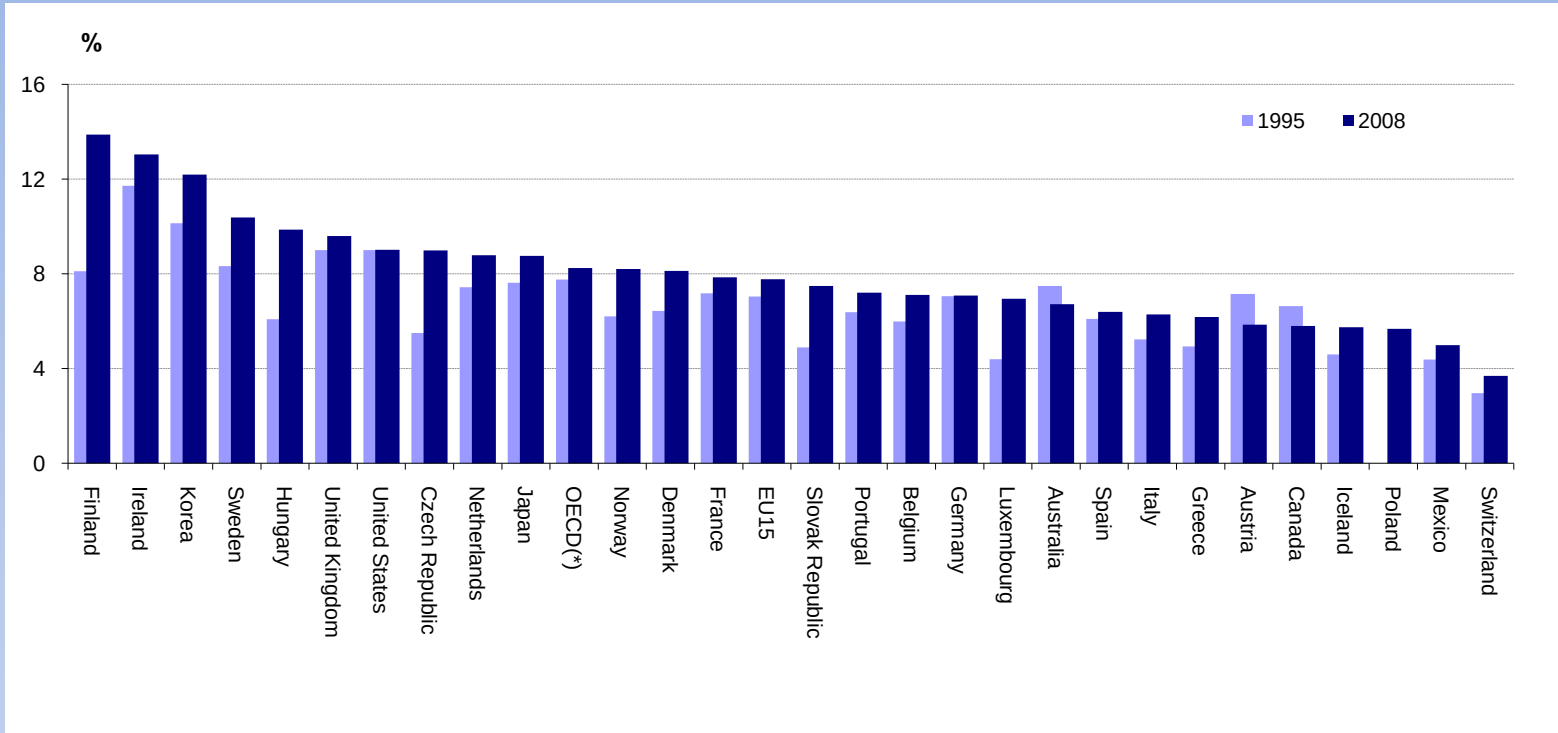
Share of ICT-specialist users in the total economy, 1995 and 2009



Source: OECD (2009) OECD Key ICT Indicators.

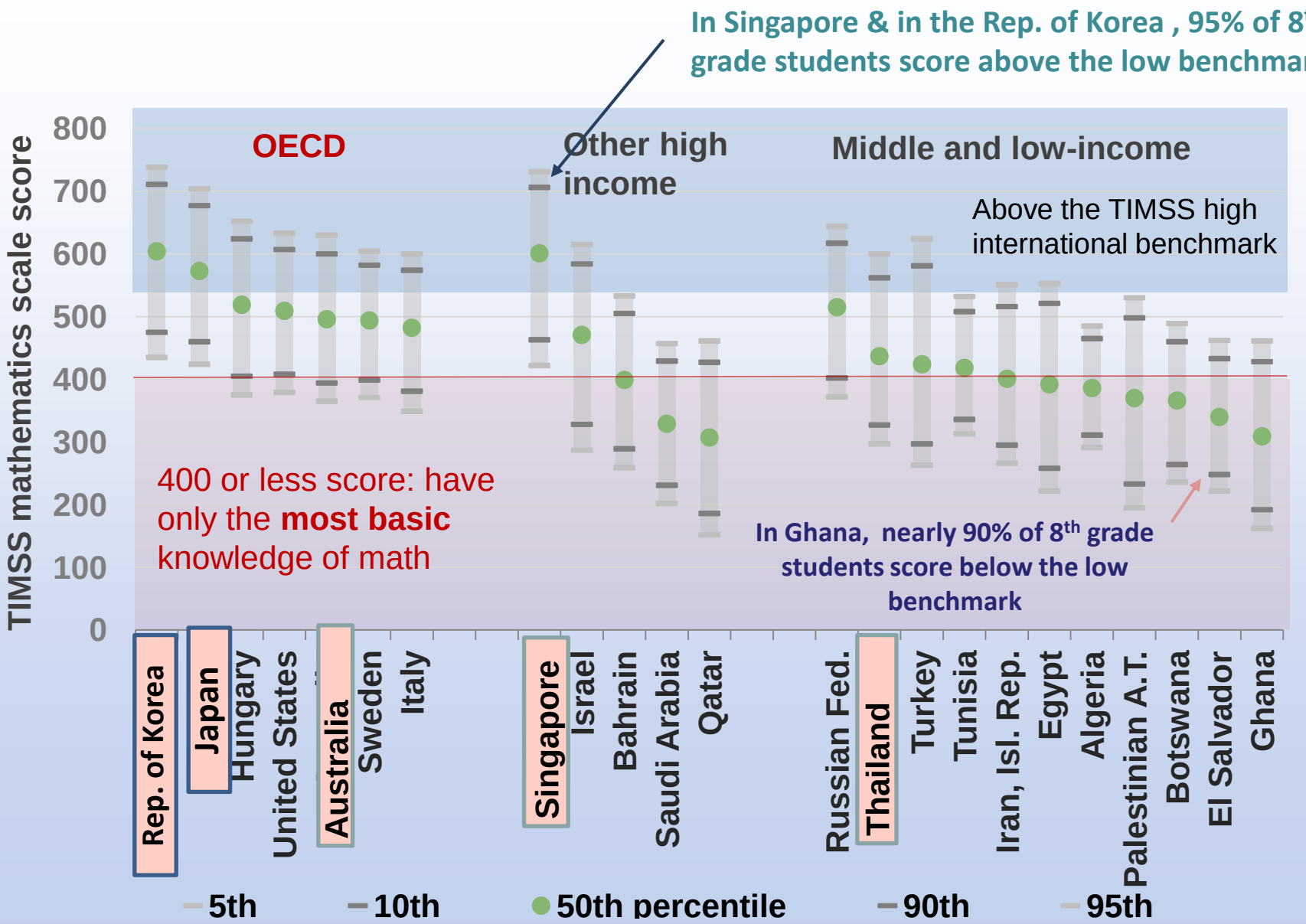
1.4 Share of ICT Value Added in the Business

Share of ICT value added in the business sector value added, 1995 and 2008



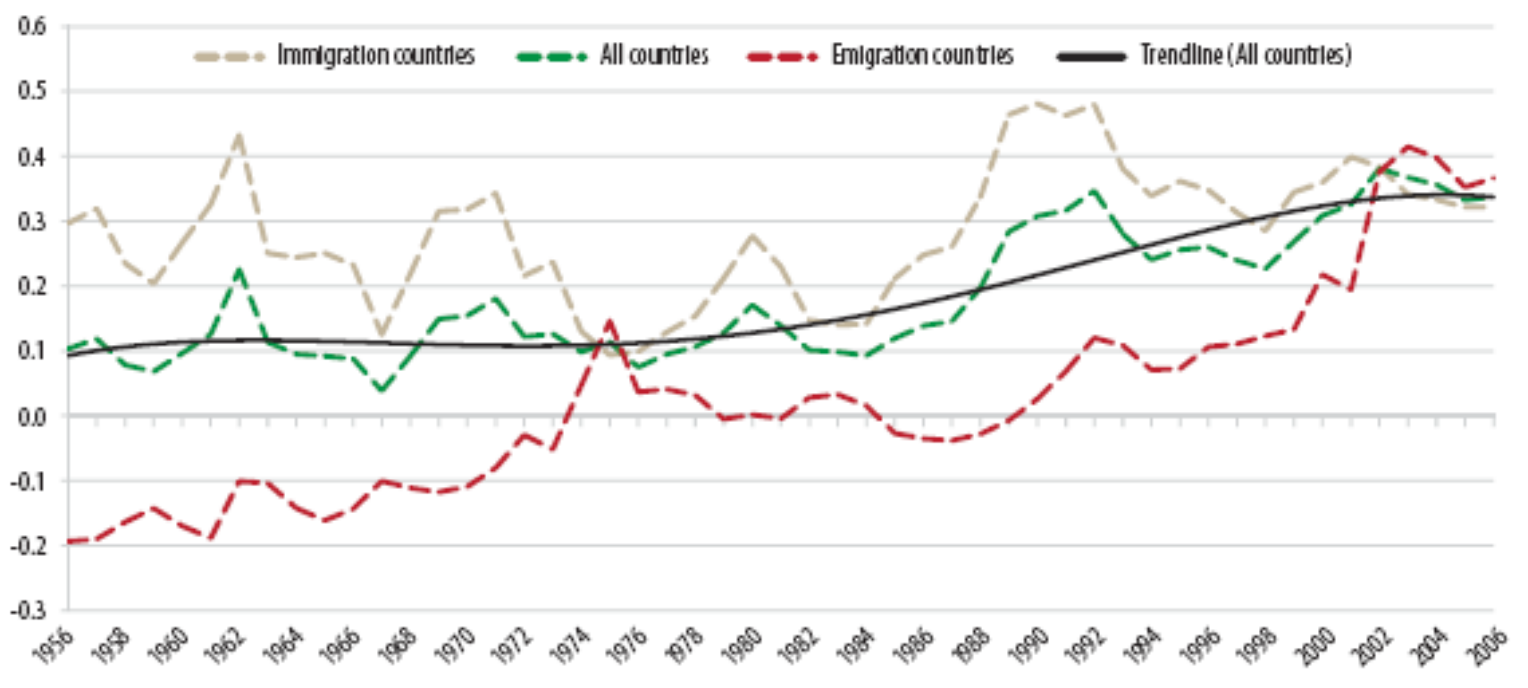
Source: OECD (2009) OECD Key ICT Indicators.

1.5 The Global Education Quality Divide



1.6 Increasing and Converging Migration Rates

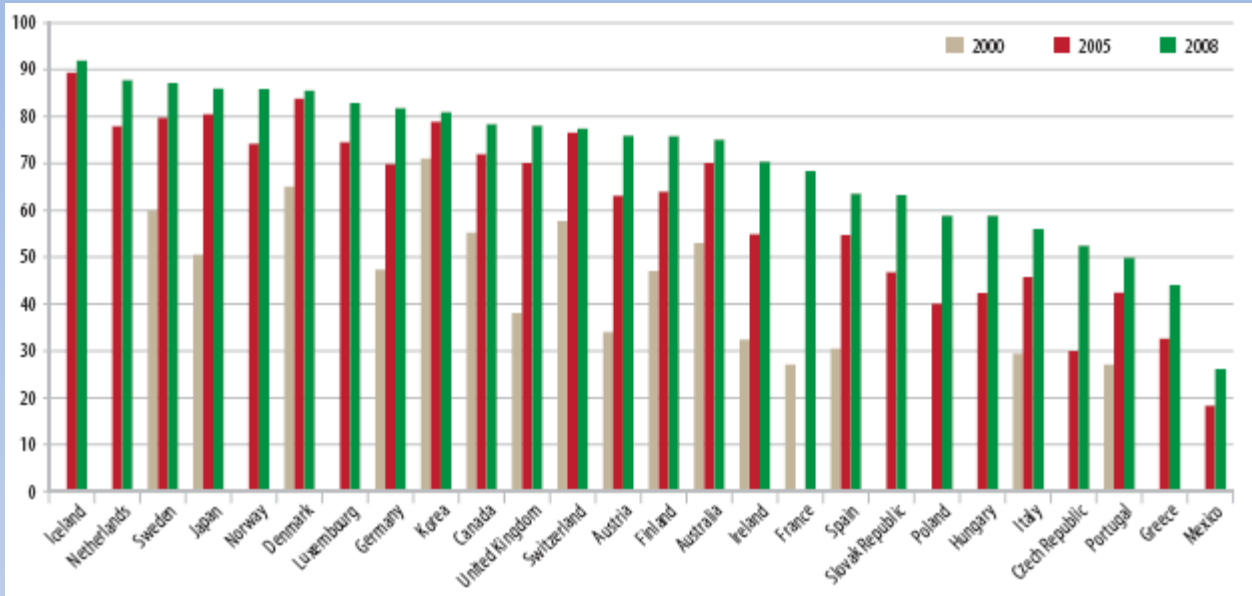
Annual net migration rate (per 100 population) of traditional immigration and emigration OECD countries, 1956-2006



Source: http://dx.doi.org/10.1787/888932320713

1.7 Growing Access to Home Computers

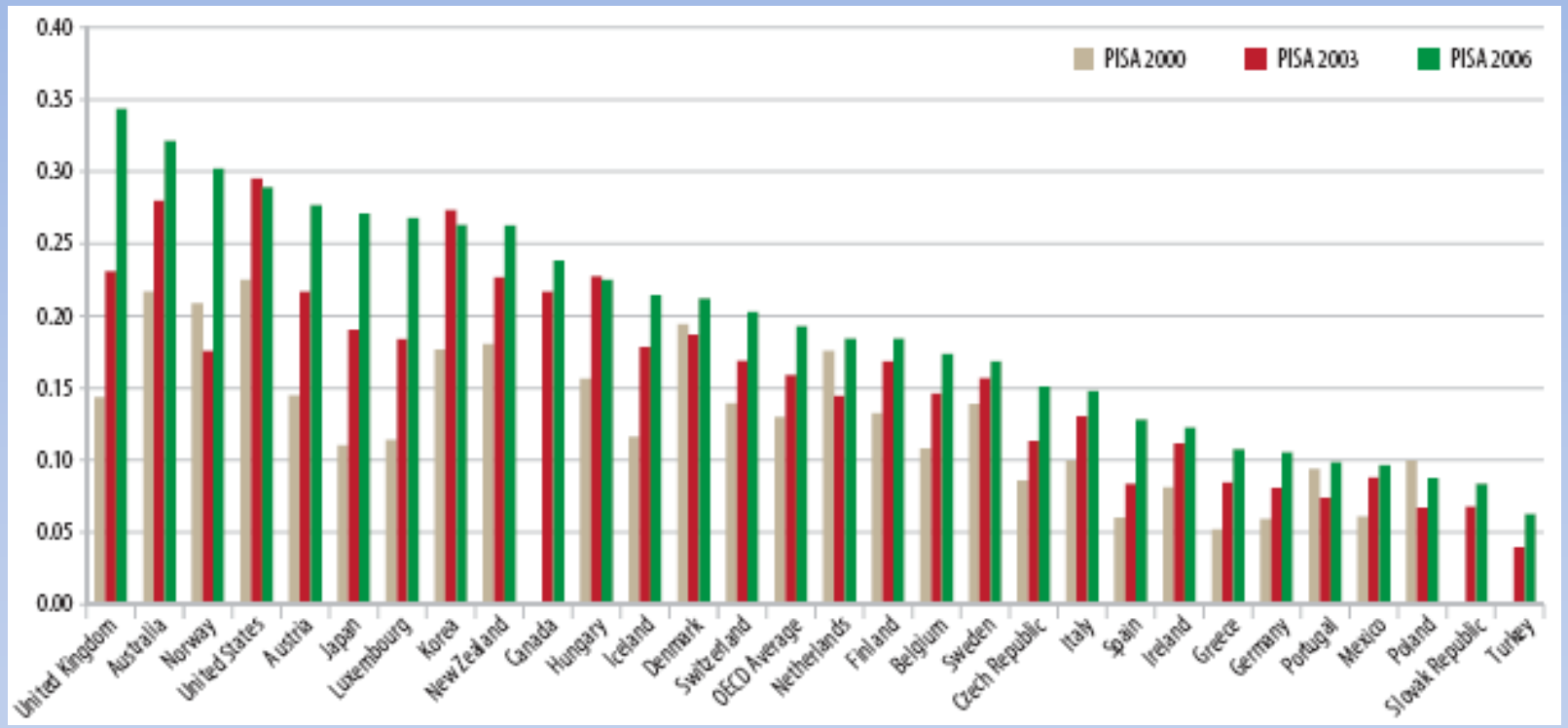
Households with access to a computer at home (including desktops, portable and handhelds), In 2000, 2005 and 2008



Source: OECD (2009), OECD Key ICT Indicators.

1.8 Increasing Availability of Computer at School

Number of computer per student as reported by schools,
in PISA 2000, 2003 and 2006



Source: OECD (2000,2003 and 2006), Programme for International Student Assessment (database).

2. Definition of ICT in Education

Comprehensive approach to innovate education systems, methods, and management through Information Communications Technology

- Restructuring education system
- Diversifying teaching-learning methods & practices
- Engaging all stakeholders of education and adapting rapid to changes in society and the environment
- Enhancing education efficiency, effectiveness, and productivity

❖ ICTs refer to all technologies which can transmit, store, create, share or exchange information, including radio, television, video, DVD, telephone, mobile phone, satellite systems, computer and Internet

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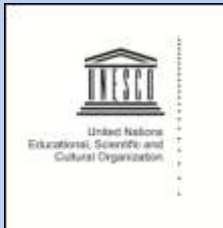
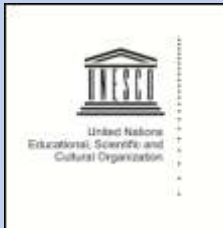
3. Scope of ICT in Education

- ICT as a subject (i.e. computer studies)
- ICT as a tool to innovate teaching-learning practice (i.e. digital content, multimedia, teaching-learning methods, learning environment)
- ICT as an administrative tool (i.e. education management information systems (EMIS)
- ICT as an expanding learning opportunity (i.e. distance learning, e-Learning)
- ICT as a facilitator of higher-order thinking skills (i.e. learner-centered, self-directed learning, tailored learning)



II. Key Policy Questions



Q1. Does ICT increase access to learning opportunities?

- Education opportunities in dispersed locations where conventional schools are not viable
- A choice to students and parents of what they want to learn
- A safety net for school drop-outs so they do not lapse into illiteracy
- Alternative venue to schooling
- Second chance education

Source: UNESCO (2003), Meta-survey on the Use of Technologies in Education in Asia and the Pacific 2003-2004

Q1. Does ICT increase access to learning opportunities?

Case from China: Modern Distance Education Project for the Rural Schools (2003-2007)

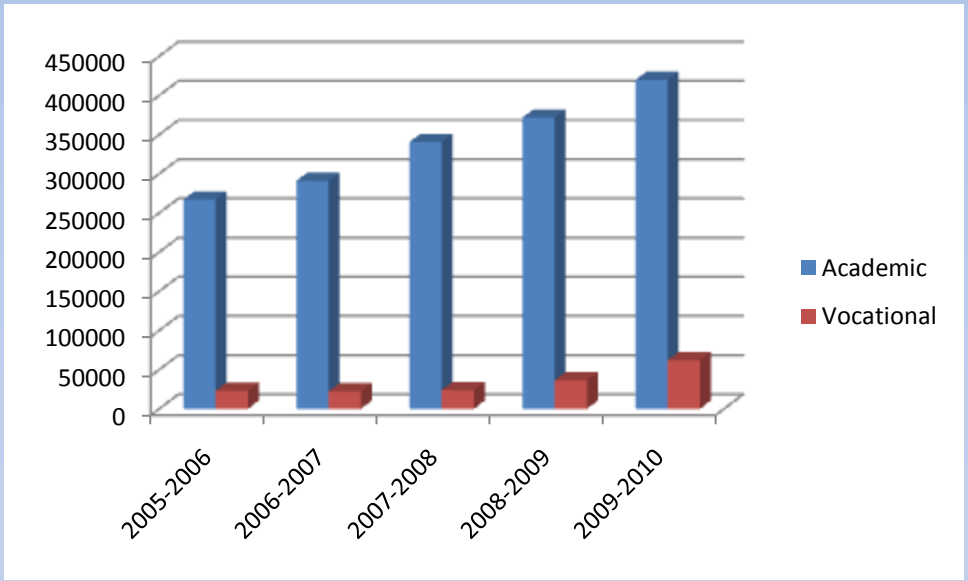
- Supplying rural schools of China with high-quality educational resources through three models:
- **Model I – DVD Playing Centers:** TV, a DVD player, and a set of curriculum-based CD-ROMs. 5.1 million under-served pupils of 110,000 rural multi-gradal teaching points benefited
- **Model II - Satellite-receiving Stations:** All devices of Model I plus satellite-receiving facilities; 81.42 million pupils of 384,000 rural primary schools are supplied with real-time learning resources.
- **Model III - Computer Labs:** Computer labs with Internet connectivity that also benefit surrounding primary schools . 31 million students in 37,500 rural secondary schools access to the same learning resources as their urban counterparts.

Source: UNESCO (2007), ICT in Teacher Education: Case Study from the Asia-Pacific Region. http://www.unescobkk.org/fileadmin/user_upload/ict/e-books/Teacher_Education_Case_Studies

Q1. Does ICT increase access to learning opportunities?

Case from India: National Open School

- Largest autonomous open schooling system in the world, with a network of 13 regional centers and more than 3,000 study centers spreading all over India and beyond.
- Offers accredited academic and vocational courses, life enrichment and community oriented courses at secondary levels; also offers elementary level courses through its Open Basic Education Programmes (OBE).



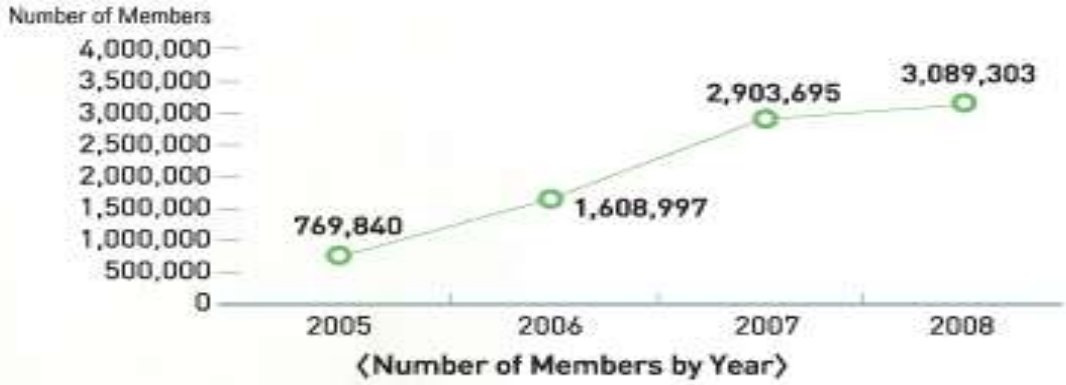
Source: http://www.nos.org/

Q1. Does ICT increase access to learning opportunities?
Case from Korea: Cyber Home Learning System

- Cyber Home Learning System (CHLS) and Educational Broadcasting Service (EBS) for economically and geographically disadvantaged students
- PC support project for low-income families
- 17 Cyber Universities for adults to promote lifelong learning

(As of August, 2008
unit : Person)

Description	Total No. of Members (Acc.)	No. of Cyber Teachers	No. of Parent Tutors	Average No. of daily visits
Total	3,089,303	60,891	4,508	304,236

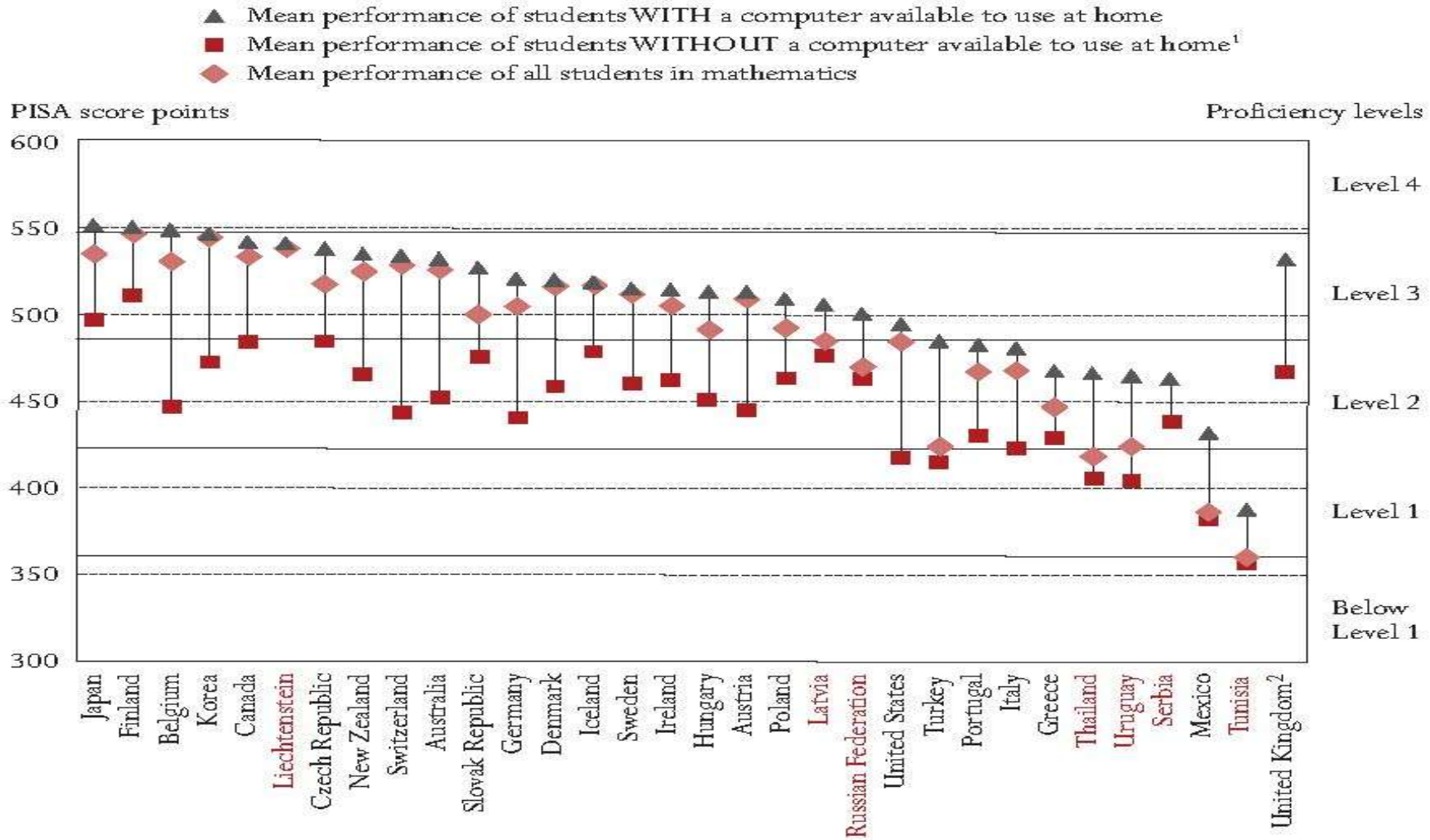


〈Number of Members by Year〉

Source: KERIS (2007), Research into the effectiveness and benefits of Cyber Home Learning System in 2007

Q2. Does ICT promote student learning?

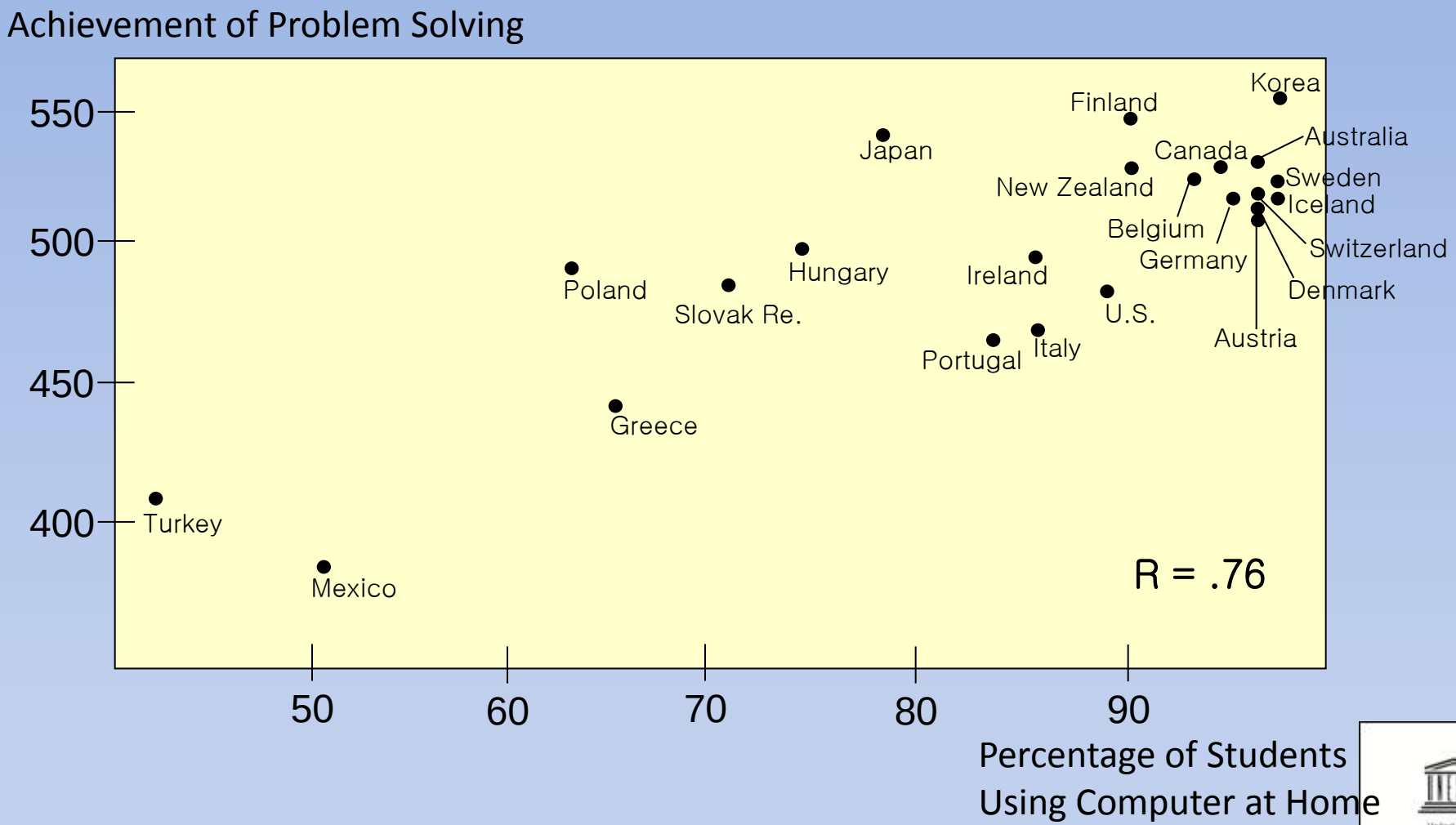
Availability/use of computer and student achievement in math



Source: OECD(2006), Are Students Ready for a Technology-Rich World? What PISA Studies tell us

Q2. Does ICT promote student learning?

Access to ICT and Student Achievement

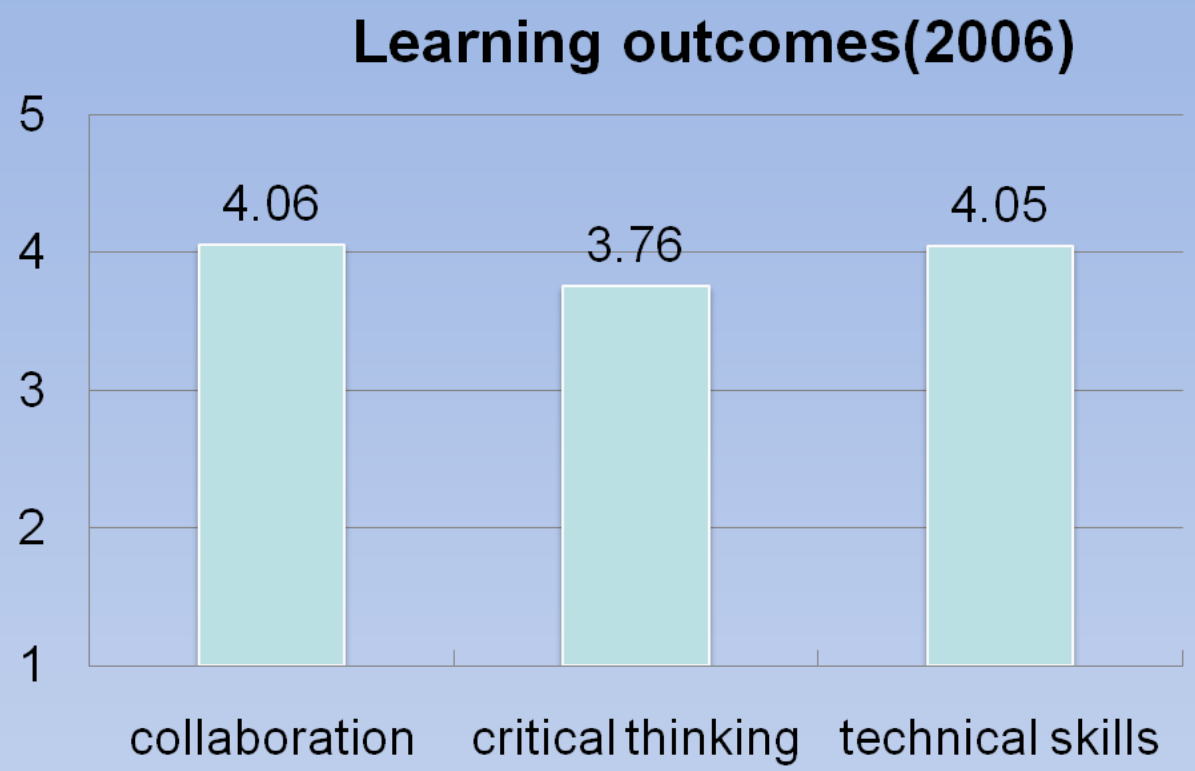


Source: PISA 2003 Data Analysis

Q2. Does ICT promote student learning?

Results of Intel "Learn Programme"

- **Target**
  children & communities that have limited access to technology
- **Curriculum**
  to design, create and solve problems in collaboration with peers in order to gain new knowledge
- **Implementation**
  422,000 children in 9 countries



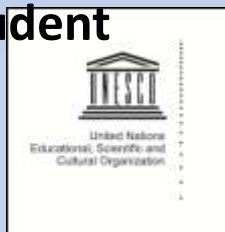
Source: Intel LEARN PROGRAM Evaluation Findings (2007)

Q2. Does ICT promote student learning?

Results of Microsoft "Innovative Teaching & Learning (ITL) Research "

- **Innovative Teaching and Learning:** ICT used for student-centered approaches, and using ICT to extend learning beyond classrooms
- **Data Collection:** self-reported data from 82 principles and 2400 teachers of 91 schools from four pilot countries; observed data including 3072 samples of student work and 1152 learning activities analyzed, 96 teachers and 96 classrooms interviewed.
- **Main findings**
  - ICT-enhanced ITL strongly contribute to 21st Century learning outcomes
  - The school level conditions to enable ITL : School-based teacher collaboration and peer support; Computers for students and teachers **in the classrooms**; Technical and pedagogical support for ICT use; Use of ICT in teaching and learning for Higher-order thinking; Incentives and recognition for innovative teaching by school leaders
  - Teacher training should emphasize the integration of ICT into **student centered pedagogies**

Source: Microsoft Partnership in Learning (2010)



Q2. Does ICT promote student learning?

Some Lessons

- If used appropriately, ICT can contribute to learning outcomes of traditional curriculum domains, and can play a greater role in developing 21st century skills which are more relevant to quality of human resources and national competitiveness
- ICT can bring real-life experiences to classrooms while extending learning beyond classrooms, thus ICT is indispensable in developing global citizens
- ICT is enabling tool of student-centered innovative learning practices that are impossible or unaffordable without ICT. But this potential cannot be unleashed if teachers reject student-centered pedagogies.
- Teachers' professional development on ICT-pedagogy integration is the key to unlock potentials of ICT for education – the powerful engine to the education machine.

Q3. To what extent can ICT be a solution for better educational management?

- National/systematic level
  - Establish a comprehensive e-government project to enhance efficiency and quality of general civil services (procurement, service delivery, monitoring and evaluation, etc.)
- Local level
  - Share data and information among education administration organizations and other government departments
- School level
  - Handle education administration in a more efficient, convenient, and innovative way

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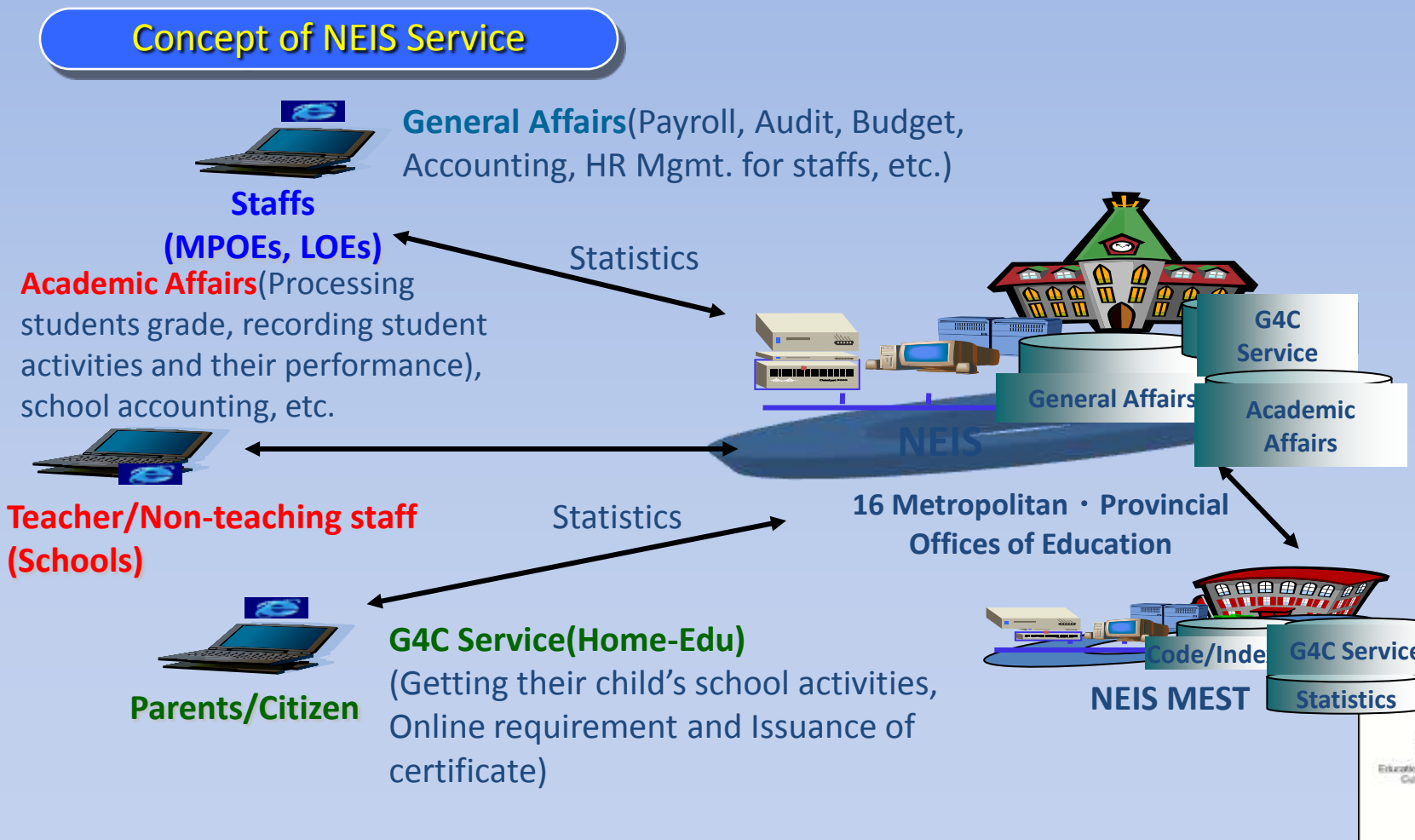
Q3. To what extent can ICT be a solution for better educational management?

Case from Korea: NEIS

- National Education Information System
- Web-based online administration system for educational administration



Q3. To what extent can ICT be a solution for better educational management?

ICT Leadership Training of Australia & New Zealand

- **Project** : Leadership Strategy – Learning in an ONLINE world
- **Purpose :** Development and application of school-based and systemic leadership to support the seamless integration of ICT in 21st century learning environment
- **Main Contents**

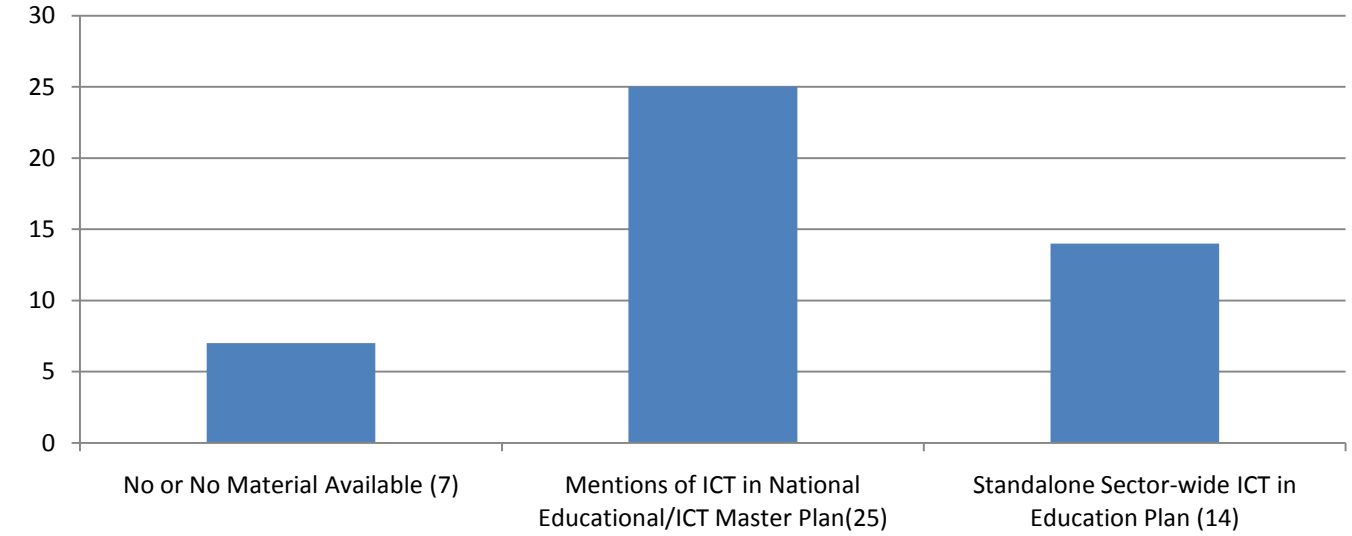
mentoring programs for students, staff and community	defined standard and effectiveness measures for online and blended learning	online teaching, learning and assessment resources, programs, tools and service
online professional learning and leadership programs based on an audit of capability	video conferencing, pod-casting and audio data conferencing	data analysis in monitoring school achievement and setting targets
electronic reporting to students, parents, and systems	security and safety policies and procedures protecting students and staffs	governance and administration processes with transparent accountabilities

Source : MCEETYA (2006)

Q4. How are Asia-Pacific countries responding to the needs in ICT in Education?

1. Governance and planning

- Sector-wide ICT in Education Master Plans have been proven effective in articulating vision and road map, mobilizing and managing funds, managing and monitoring projects
- Australia, Cambodia, China, India (some states), Japan, Korea, Malaysia, Mongolia, New Zealand, Singapore, Sri Lanka, Thailand, Vietnam have standalone sector-wide master plans



Q4. How are Asia-Pacific countries responding to the needs in ICT in Education?

2. Mobilization and management of financial resources

- **Budget total cost of ownership (TCO)** including hardware cost (upfront payment & updating), software cost, maintenance and support cost, teacher training cost, (digital) content cost, management cost, etc.
- **Diversify sources of funding** through special tax, public & private funds, tax reduction to related industries
- **Strengthen cooperative mechanism** among MOE units, between central & local education agencies, and with private partners
- **Introduce a multi-year budgeting system** to guarantee and sustain investment in ICT from a longer rather than a short term perspective

Q4. How are Asia-Pacific countries responding to the needs in ICT in Education?

3. Curriculum adjustment

- ICT as a subject area
- ICT as part of other subjects: new contents and pedagogy
- ICT-enabled new learning activities

4. Staff training

- ICT Competency Standards **for Teachers**, Administrators, and ICT Coordinators
- Capacity building for monitoring & evaluation of ICT in education (UNESCO-UIS ICT in Education Indicators)
- Training contents and training methodologies

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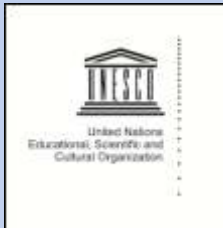
III. UNESCO's Work



How UNESCO' can contribute to its Member States

- Standard setter
- Capacity builder
- Laboratory of Ideas
- Clearing house
- Catalyst of international cooperation

Focus Areas of UNESCO ICT in Edu Programme

- **Standard Setting:** policy dialogue , technical assistance in making master plans, ICT in Education Indicators
- **Capacity Building:** from policy makers, teacher trainers, to master teachers and from individual to institutional capacity
- **Catalyst for International Cooperation:** ICT for Literacy Education , ICT in non-formal Education (Community Multimedia Centers)
- **Laboratory of Ideas:** ICT in Higher Education,(e.g., Researches on the employability of IT graduates)
- **Information Clearing House:** research & knowledge sharing

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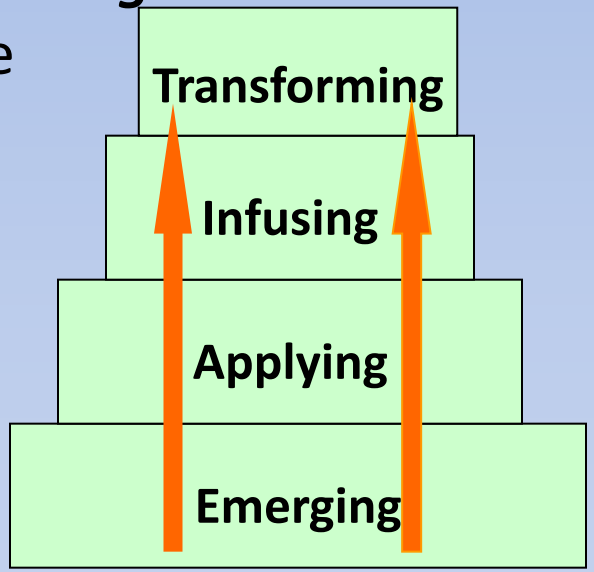
1. Examples of Standard Setting

- ***A Regional ICT Competency Standard for Teachers*** (a document in process) of UNESCO Bangkok focusing on: Integrating generic tools in learning practices, Enhancing teaching and facilitating learning, Processing curriculum resources & learning materials, Integrating ICT for pedagogical innovation
- ***ICT Transforming Education: A Regional Guide*** to guide the teachers to move upwards the four-stages of ICT-Pedagogy Integration



(a) Stages of ICT skills *(b) Pedagogical Usages*

2. Capacity Building I - Building national capacity in ICT in education policy planning

- ICT in Education Policy Toolkit in collaboration with World Bank (www.ictinedtoolkit.org)
- More than 400 policymakers of 29 countries trained
- Assisted Cambodia, Sri Lanka develop National ICT in Education Master Plans. Discussing with Bangladesh

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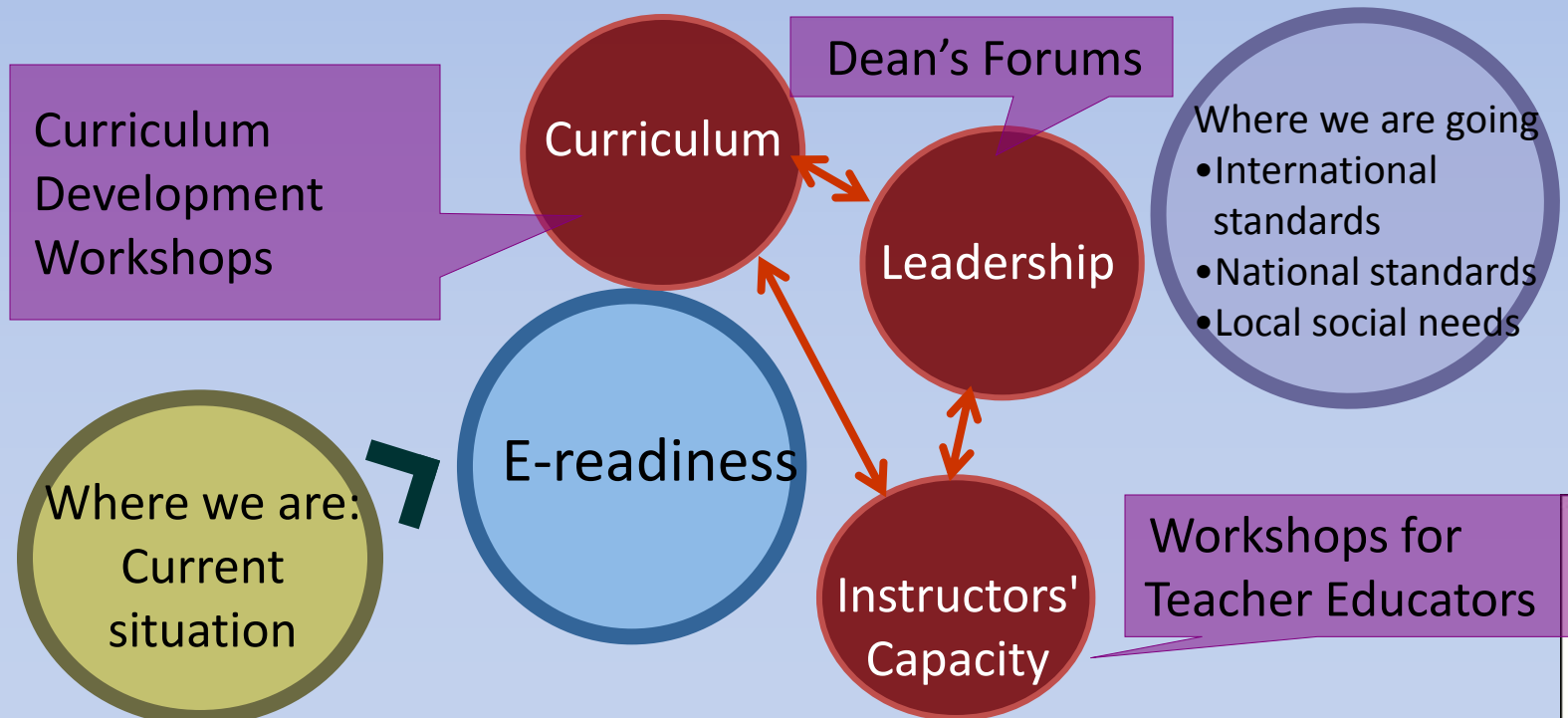
2. Capacity Building II – Next Generation of Teachers Project

- **Institutional capacity building** of teacher education institutions through a 3-pronged approach: Deans' Forum, ICT Curriculum Development, and Training of Trainers



2. Capacity Building III – Building individual capacity of key actors

- Training of trainers and master teachers: National Workshops on ICT-pedagogy Integration for 13 countries and over 400 teacher educators trained
- Development of E-learning modules
  - ICT in ED Essentials and ICT in Education Decision-Making
  - Development of training modules and supporting materials
  - Online learning modules
  - Online forum

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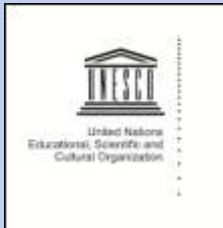
3. Laboratory of Ideas I – ICT for Higher Education Project

- Case studies on Employability of IT/ICT Graduates: China, Korea, Malaysia, the Philippines and Indonesia
- Case studies on Use of ICT in HE
  - Use of ICT for Administration and Management at the Hong Kong University
  - Use of ICT in ODL of Korean National Open University
  - Use ICT for ODL/Blended Learning/Research/Administration and Management Services University at Queensland University of Technology (Australia)
  - The Extensive Application of ICT in Learning Support: Practice and Exploration of Distance Education in Shanghai TV University, China
  - Blended Learning in NTU: Making online learning work effectively in a HELPful way (Singapore)
  - USE OF ICT FOR ODL/Blended Learning/Research/Administration & Mamagement (India)
  - Use of ICTs in Management and Technical Education in India



3. Laboratory of Ideas II – KFIT-funded "3Is" Project Based Learning and Tele-collaboration

- Overall Goal:

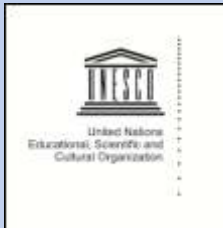
  - to assess the impact of ICT-based pedagogy on students' 21st century skills, with specific focus on interdisciplinary, inter-school, and inter-cultural project-based learning and tele-collaboration

- Key Features:

-Two TEIs with 20 surrounding schools from each of 10 countries

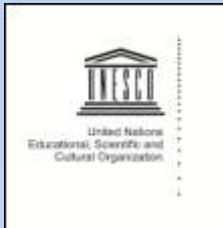
- Partnership between teacher education institutions (TEIs) and schools, and between teacher trainers and teachers

- Students' direct and creative use of ICT in learning



4. Information Clearing House

- ICT in Education Website
  - No. 1 in Google Search Engine with key term of “ICTinED”
- e-Newsletter
  - Published every 2-3 weeks and auto-sent to over 4500 global subscribers
- Print publications and CD-Roms
  - Over 30 publications produced, and about 4000 copies sent to over 500 distinctive recipients
- Online Community: www.unescobkk.org/forum/education/ict
- Awards on ICT in Ed Innovative Practice
- E-School Award in cooperation with Intel



5. Catalyst for International Cooperation

- Facilitating North-South-South cooperation and knowledge sharing
- Conference on ICT in Education co-organized with the World Bank, November 2009 in Hangzhou, China
- Asia-Pacific Ministerial Forum on ICT in Education with Intel
- Promoting inter-agency pilot studies
- ICT for Literacy Education with five UNESCO Field Offices
  - Inter-agency cooperation on ICT in Education Indicators
  - Benchmarking Education (including ICT in Education) with the World Bank

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IV. Recommendations

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Recommendations

- Political commitment and leadership
- Strategic choices on targets and modalities
- Sustainable investment in ICT in education
- Constant renewal of knowledge and practice
- Capacity building through N-S-S cooperation

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