2010 ICT in Education Readiness Report: Lessons to Developing Countries

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Contents

Purpose of global indicator development
Characteristics of ICT4ED Indicators
Summary of 2010 ICT4ED Readiness Report
Lessons and Vision of ICT4ED Indicators
The Purpose of Developing Global Indicators for ICT in Education
Cooperation with Developing Countries

- Requests from developing countries for sharing of educational experience of Korea

- Korea assists developing countries to reform educational systems with ICT, and bridging the ‘digital divide’

- Providing consulting services of ICT in education to Asia-Pacific countries
  - E-Learning Globalization Initiatives since 2006
    - Site survey, collaborative studies and planning for educational changes
    - Dominican Republic, Uzbekistan, Azerbaijan, Vietnam, Sri Lanka, Mongolia, Laos, Cambodia, Thailand, Columbia etc.
Reasons of ICT Use in Education

- Development the nation through ICT use in education
  - Improve the delivery of and access to education
    - Improve education on the margin
    - Improve the quality of education
    - Increase the impact of education on the economy
  - Focus of learning
    - Students become better prepared for work that increasingly involves the use of ICTs
  - Transformation of the education system and to sustained economic growth and social development
    - Knowledge creation and sharing
    - Technological innovativeness
The Necessity of M/E in ICT in Education

- Substantial investment of money and effort are needed in implementing ICT policy in the education system.

<table>
<thead>
<tr>
<th>Before investment</th>
<th>After investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Do we really need to invest?</td>
<td>• Does the investment make results as planned?</td>
</tr>
<tr>
<td>• Which direction is the best way?</td>
<td>• Does the ICT in education in the nation really work?</td>
</tr>
<tr>
<td>• Where we are and where we need to go?</td>
<td>• Every parts of the ICT in education function as planned?</td>
</tr>
</tbody>
</table>

- Monitoring and Evaluation focuses are different according to each nation’s stage
  - Various indicators are needed according to the project stages.
To the extent that countries aim to achieve educational goals, they need to measure their progress, successes and problems.

For policy makers, there is a paucity of comparable data between countries on the availability, access, use and impact of ICT in education at the national level.

Putting in place and implementing relevant policies, strategies and plans need to develop suitable indicators to guide the application of ICT to meet needs.

Need Indicators for ICT in education to provide evidence for planning, monitoring, and evaluation for effective consulting to developing countries.
Monitoring Issues Vs. Developing Stages

- **Planning/Take-off stage**
  - Policy
  - Infra
  - Contents
  - Human resources

- **Developing stage**
  - Policy
  - Infra
  - Contents
  - Human resources
  - Curriculum

- **Expanding stage**
  - Policy
  - Infra
  - Contents/Standardization
  - Human resources
  - Curriculum
  - Educational information on-line services between school, home, and society
<table>
<thead>
<tr>
<th>Situation</th>
<th>Major interests</th>
<th>Needed indicators</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Developing Countries/ • LDC</td>
<td>Planning Expected outcomes after investment</td>
<td>Input indicators</td>
<td>Required resources: baseline information</td>
</tr>
<tr>
<td>• Developing Countries / Countries invest to ICT in Education</td>
<td>Monitoring the effectiveness of the investment</td>
<td>Process indicators Indicators of action/output indicators</td>
<td>Adjustment invest plan, actions</td>
</tr>
<tr>
<td>• Countries invested and expected outcomes</td>
<td>Evaluate outcomes of investment</td>
<td>Indicators of Reaction/Output indicators</td>
<td>Purpose/Outcome</td>
</tr>
<tr>
<td>• Developed countries</td>
<td>Impact measurement</td>
<td>Impact indicators</td>
<td>Overall objective</td>
</tr>
</tbody>
</table>
It is recommended to develop a global indicator that covers whole scope of ICT use in education without disregarding national socio-economic context through integrating existing indicators for ICT in education.

Need to develop indicators to be measurable globally, comparable and measured in various domains of ICT in education.

Need to design indicators Not Just Numbers, but useful to extract the meaning for consulting to developing countries.
Characteristics of ICT for Education Development (ICT4ED) Indicators
Educational Purposes and Readiness of ICT in Education

Purpose

MDG/EFA

Improving creativity, learning capabilities
Providing learning opportunities

21st century skills

Major Infra

Radio TV

Radio TV Computer A/V Equip.

Computer Internet A/V Equip.

Computer Internet Digital toy Digital devices A/V Equip.

Readiness factors

Infra oriented

Infra Human resource oriented

Curriculum Pedagogical issues

Assessment strategies

Policy Finance Infra

Policy Finance Human resources Contents

Impact to learner’s skill and attitude
Relationship between Economic Growth and Educational Development

Educational Development

Empowering individual capabilities (knowledge, skills, attitude)

Rise in income (national, regional and individual)
Improved ability to invest and consume

Economic growth (industrial development)

Create issues

NEDG
Provide industry for trained people
New requirements
## Economic Development and Education Policy in Korea

<table>
<thead>
<tr>
<th>National Development Phase</th>
<th>Economic Development</th>
<th>Education Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1 (1945-1960)</td>
<td><strong>Agriculture Society</strong>, Postwar Reconstruction, Period Export-Centered Industrialization</td>
<td>Establishment of Basic Education System, Universalization of Elementary Education</td>
</tr>
<tr>
<td>Phase 2</td>
<td>1960s <strong>Labor-Intensive Industrialization Centered on Light Industry</strong></td>
<td>Expansion of Secondary Education, Training and Expansion of Vocational Technology Education</td>
</tr>
<tr>
<td></td>
<td>1970s <strong>Heavy and Chemical Industrialization, Fostering Large Companies</strong></td>
<td></td>
</tr>
<tr>
<td>Phase 3 (1980s-1990s)</td>
<td><strong>Technology, Knowledge, Information-Intensive Industrialization</strong></td>
<td>Expansion of Higher Education, ICT in Education for IT industry</td>
</tr>
<tr>
<td>Phase 4 (2000-present)</td>
<td><strong>Entry into Globalization, Informationalization, Knowledge-Based Economy</strong></td>
<td>Popularization of Higher Education, Educational Informationalization, Lifelong Learning, National Human Resource Development</td>
</tr>
</tbody>
</table>
The Korean Experience of ICT in Education

Adapting ICT into Education Master Plan II

School Computer Education Reinforcement Plan

15

Legend
- Policy
- Educational information infrastructure
- Educational content
- Educational information standardization
- Human resources for ICT education
- Curriculum and Teaching Methods
- Educational information service
Representative Projects for K-12 Education

**EDUNET**
- The National Teaching & Learning Center
- A comprehensive education information service with public access
- Designed specifically for teachers and students
- Provides a range of instructional and material for learning support, and other education-related information

**NEIS**
- The National Education Information System
- An integrated e-administration system, is designed to enhance the efficiency of general educational administrative tasks
- Improve the work environment for teachers and provide new educational administration information services for the public

**VOD based E-Learning**
- An educational TV broadcasting system (EBS) combined with e-learning
- Filmed lectures are provided for preparing CSAT

**CHLS**
- The Cyber Home Learning System
- A web-based program that enables self-study at home or at sites
- Students can learn at their own pace with adjustable materials to suit their individual needs
Framework of ICT4ED

Policy
- Laws/Regulation/Budgets
- Hardware/Software/Internet Access/Communication Tools/Fundamental Infra

Infrastructure
- Teacher/Staff/IT Specialist/Training Opportunity

Human Resource
- National standards for ICT use/ICT literacy/Cyber ethics

Curriculum
- Teaching and learning support service/Educational administrative service

Service
- Development/Sharing and Distribution

Educational Resource
- Utilization of Infra/Curriculum/Service/ER

Usage
- Gender/Region/Special Needs

Impact of ICT4ED

Teacher Outcome

School Context Outcome

General Context Outcome

Student Outcome
### Monitoring Issues for ICT in Education [1]

<table>
<thead>
<tr>
<th>Domain</th>
<th>Possible monitoring issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>Provision on law, budget, drive system to implement strategies, vision &amp; plan for ICT in education</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Status of telecommunication infra, Internet infra, PCs, broadcasting infra (TV, Radio), power, equipments, etc.</td>
</tr>
<tr>
<td>Human resource development</td>
<td>Indicators on the supply and demand of human resources for ICT in education, professional development such as teacher training, educational officer training Head teachers and other administrators trained in leading and managing ICT integration?</td>
</tr>
<tr>
<td>Educational contents</td>
<td>Indicators on contents development, distribution, quality management</td>
</tr>
<tr>
<td>Standardization</td>
<td>Indicators on the content standardization and content reusability</td>
</tr>
</tbody>
</table>
## Monitoring Issues for ICT in Education [2]

<table>
<thead>
<tr>
<th>Curriculum</th>
<th>Indicators on using ICT for teaching, learning and assessment? No. of schools with independent computer courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education information service</td>
<td>Indicators on Online teacher training, Portal for teaching and learning activities, Digital knowledge/resources bank for schools</td>
</tr>
<tr>
<td>Administrative service</td>
<td>Indicators on E-government/e-administrative services for schools</td>
</tr>
<tr>
<td>Impact</td>
<td>Indicators on Students have increased confidence and competence in using ICT? Students’ enthusiasm for learning is improved by using ICT? Students’ communications skills are improved by using ICT? Students’ problem-solving and higher order thinking skills are improved by using ICT? Students’ creativity is improved by using ICT? Learning outcomes are improved by using ICT? Cost savings are achieved by using ICT? Other benefits come from using ICT?</td>
</tr>
<tr>
<td>Equity</td>
<td>Monitoring gender difference to the ICT use Providing educational opportunities marginal learners, special needs</td>
</tr>
</tbody>
</table>
Summary of 2010 ICT4ED Readiness Report
Data collection period: three months (+ one month)
145 questions for 82 indicators
High Response Rate to qualitative questions

<table>
<thead>
<tr>
<th>Domain</th>
<th>Sub domain</th>
<th>Number of indicators</th>
<th>Number of questions related with indicators</th>
<th>Number of indicators used for readiness analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>Laws/Regulations/Policy</td>
<td>2</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Budgets</td>
<td>5</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Hardware</td>
<td>8</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Software</td>
<td>4</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Internet access</td>
<td>5</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Communication tools</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fundamental Infra</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>
## Response Characteristics of 2010 ICT4ED[2]

<table>
<thead>
<tr>
<th>Human Resources</th>
<th>Teacher</th>
<th>4</th>
<th>8</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>IT specialist</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training opportunity</td>
<td>3</td>
<td>9</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curriculum</th>
<th>National standards for ICT use in teaching and learning</th>
<th>5</th>
<th>5</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>National standards for ICT literacy</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Cyber ethics</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Data Sources and Respondents’ Feedback

Data source

- Official
- Survey
- Experts
- Focus group
- By the team

Feedbacks

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Useful</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Yes (%) and No (%) bars for each feedback category.
Examples of Analysis

Without comparison, but to show country status of readiness

- Weight values

<table>
<thead>
<tr>
<th>Domain</th>
<th>Sub domain</th>
<th>Indicator</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>Laws/ regulations/ Policy</td>
<td>Existence of laws related to ICT in education</td>
<td>(50%)</td>
</tr>
<tr>
<td></td>
<td>(50%)</td>
<td>Existence of policies related to ICT in education</td>
<td>(50%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percentage of education</td>
<td></td>
</tr>
</tbody>
</table>

- Readiness in each domain:
  - \(0.5 + \frac{(C.V - M)}{SD} \times 0.1\)
- Considering special characteristics of education
  - Policy and budget etc.
  - \(0.5 + \frac{\text{Natural Log}(C.V) - M}{SD} \times 0.1\)
[Figure II.1] The percentage of schools with computers.
Impact Analysis

[Figure III.1] ICT Outcome Perception Index
Correlation of ICT4ED Indicators

- The correlation of ICT4ED with other international indices

[Figure III.6] Scatter plot between learner-to-computer ratio and Human Development Index.
Correlation of Domains in ICT4ED[1]

The relationships of domains for ICT in education

<table>
<thead>
<tr>
<th>Domain</th>
<th>Correlation Coefficient</th>
<th>Number of Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service - Usage</td>
<td>.913**</td>
<td>7</td>
</tr>
<tr>
<td>Policy - Service</td>
<td>.778**</td>
<td>11</td>
</tr>
<tr>
<td>Infrastructure - Educational Resource</td>
<td>.743*</td>
<td>8</td>
</tr>
</tbody>
</table>

* p<.05, ** p<.01

[Table III.1] The Pearson correlation coefficients of domain scores of the ICT4ED

[Figure III.8] Scatter plot between Infrastructure Domain Score of ICT4ED and Knowledge Economic Index (KEI, 2009)
Each country’s readiness of ICT in education compared with the Mean value of responded countries

- Avoid sensitivity of cross-country comparison
- Not responded domains are removed from the analysis

Possible to identify the most needed domain
Lessons and Direction of ICT4ED Indicators
Vision of ICT4ED

- Providing information for consultancy on ICT in Education
- Global Capacity Building of ICT in Education Policy Makers in developing countries
- Survey and analysis of global readiness on ICT in Education

Selected countries → Survey with ICT4ED → Publish Global Readiness for ICT in Education → Select interests countries → Policy maker from the target country analyze with ICT4ED → Co-work with Korean researcher → Presentation ICT in Education Global Symposium → Develop New Projects for Enhancing Education → CSR with Inter. Organizations KERIS

Organizing Working group
Capacity building for data collection
Collect data
Data validation
Connection with International Cooperation
Capacity Building For Education Development
Role of ICT4ED Indicators Development

- Continuous update is necessary due to new technologies are developed
- Maintaining working groups
- Capacity building process for data collection
- Possible international cooperation and developed cooperative projects
Learned Lessons

❖ Benefits
  ■ This work helps us to know what kind of data we need to consider to assess ICT4ED
  ■ Help to improve data collected already

❖ Recommendations
  ■ Careful with some information and data to present
  ■ The lack of information affects the comparisons among countries
  ■ How to obtain a continuous measured from quality data
  ■ Need to improve educational management information system
  ■ The indicators need to consist of not only current and past status, but also need to show **new technology applied in education**
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