Technology-enhanced EMIS for an SDG 4 Future

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Jonghwi Park, ICT in Education, UNESCO Bangkok
Education Management Information Systems

“a collection of component parts that include inputs, processes, outputs, and feedbacks that are integrated to achieve a specific objective. It is a system for managing a large body of data and information that can be readily retrieved, processed, analyzed, and made available for use and dissemination.” (Villanueva, 2003)
Some countries are still caught in a vicious circle of EMIS ineffectiveness... but ICT is one of the ways out.

“Sustainable use of EMIS platforms requires ongoing capacity to maintain ICT hardware and software, in parallel with all stages of implementation.”
ICT & EMIS: a symbiotic relationship

Effective ICT integration ↔ Better Data ↔ Stronger EMIS
How can we ensure continual ICT support in EMIS?

EMIS in ICT in Education Masterplan

- Local technical and human resources development
- Resource allocation for ongoing technical support
- Financial planning to cover associated capital and recurrent costs

Source: ADB, 2018
EMIS’s position in ICT in Education Master Plans
Maldives

**Implementation Objective #9:**
Install an online educational management information system (EMIS)

<table>
<thead>
<tr>
<th>Responsible office:</th>
<th>Activities:</th>
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<tbody>
<tr>
<td>MOE-Policy and Planning Section</td>
<td>9.1 Review existing EMIS and determine list of needs for improvement</td>
</tr>
<tr>
<td>Partners: NCIT, NIE</td>
<td>9.2 Improve existing EMIS or design a new one</td>
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<td>9.3 Develop training module for users</td>
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- MOE to decide whether to adopt new EMIS or update existing
- Conduct rapid EMIS appraisal
- Training personnel to use new EMIS software
- Core group trains others later

Source: UNESCO; Maldives ICT in Education Master Plan
Timeline of EMIS

2014: Old EMIS is evaluated

2015 (1): UIS and UNICEF focus on developing technical aspects of new EMIS

2015 (2): new OpenEMIS software installed for MEMIS

2016 (1): MoE pilots MEMIS with 20 schools

2016 (2): week long training of personnel using ToT model

2017: MEMIS rolled out to all schools

2017 (2): Android/iOS student attendance monitoring app launched

Source: UNESCO, 2018
Moving Forward

- Integrating MEMIS with other government information systems;
- Extending use of MEMIS data beyond education management and administration into education **planning** and **policy formulation**, and monitoring and evaluation.
- Enhancing capacity on identifying of relevant **indicators** and **data reporting**.

Source: UNESCO, 2018
### Project 3.2.1: Expansion of Education Management Information System (EMIS)

**Responsible office:** MOE  
**Partners:** Various Ministries

<table>
<thead>
<tr>
<th>Areas:</th>
<th>Processes:</th>
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</table>
| - Organization: infrastructure  
- Staff: teachers  
- Students: PP to Class 12 | - Web interface  
- Excel based tools  
- Unique IDs  
- Integration with Non Formal Education MIS |

**Data Collection**

Source: UNESCO 2018; Bhutan iSherig ICT in Education Master Plan; Borgen Magazine
Timeline of EMIS

2005: first conceptualized

2006: work begins

2007: prototype developed in-house

2010: EMIS V0.1 completed and piloted in Thimpu

2011: basic data collection using Excel

2014: all personnel trained with UNICEF’s support

2015: data collected and cleaned using web-based Excel

Source: EMIS Presentation to HRD 9th Oct 2015
Moving Forward

- Creating systems for better data visualization to make it more user-friendly (eg. data dashboards)
- Utilizing EMIS beyond basic education data such as for tracking education infrastructure
- Reducing scope of project to support an incremental approach at EMIS development
Timeline of EMIS

**Preparation for information society**
- Standardization & distribution of educational PCs (16 bit) (1989)
- School Computer Education Master Plan (1987)
  - Installation of first educational computer (1972)

**Building infrastructure**
- Completion of educational ICT infrastructure
- Guidelines for ICT in Education in primary & secondary schools (2000)
- RISS (1998)
- ICT in Education Master Plan I (1996)
  - EDUNET (1996)

**Teaching & learning with ICT**
- Development & distribution of content
- Improving teaching methods
- e-Learning Global Cooperation Center (2006)
- ICT in Education Master Plan II (2001)
- NEIS (2002)

**U-Learning & Smart Education**
- Ubiquitous society
- Ubiquitous learning
- Operation of Digital Textbook Model Schools (20, 2008)
- ICT in Education Master Plan III (2006)
- Digital Textbook Development Plan (2007)
- U-classroom (2007)

**Customized Learning**
- Customized learning
- Kindergarten Information Disclosure Public Service (2012)
- Operation of Smart Model Schools (2012)
- SMART Education Strategy (2011)
South Korea
NEIS, National Education Information System

• A Web-based integrated administration system for education administration & finance
  ▪ 17 Metropolitan and Provincial Offices of Education
  ▪ 180 Local Offices of Education
  ▪ 11,200 Schools (Elementary, Middle, High, and Special Schools)

• General administration:
  ▪ General administrative affairs for teaching and non-teaching staffs
  ▪ HR management, Payroll, Edufine (budget, expenditure), Education statistics, etc.

Educational information:
  ▪ Handling student information and school administrative affairs
  ▪ Academic affairs, School admission, Health care, School meal, etc.
  ▪ Public announcement for all schools
What does it take to build an effective ICT-supported EMIS ecosystem?

*Lessons from our work*

- Political Commitment
- Basic ICT infrastructure
- Simple but efficient technology
- Human Capacity Development
- Pilot and Scaling

Towards a more advanced and futuristic EMIS

*A step-by-step / incremental approach*
What does the future hold?

“The proliferation of data-mining software and developments in online education, mobile learning, and learning management systems that leverage analytics and visualization software to portray learning data in a multidimensional and portable manner.”

- Horizon Report 2016
Open Data Dashboards

Collect, synthesize & visualize data

Effective decision making & reporting

User-generated feedback

Source: http://educationdashboard.org
Artificial Intelligence (AI) for EMIS

Data Mining

Machine Learning

Automate and expedite high volume processes + Tailor data collection

Source: forbes.com ; Video: https://www.youtube.com/channel/UCIQO1MEJ3xgXIN5HZ1ZCyCw
BIG Data and Blockchain for EMIS

Big Data

- Real time data
- Forecasting future trends
- Policy making with other sectors
- Personalised & Lifelong learning

Secured by Blockchain technology
Internet of Things (IoT)

4 steps to IoT in Education
1. Connect stand-alone devices to the internet
2. Track data
3. Collect relevant data
4. Ease administrative tasks

Smart Classrooms

Increase in Tech Use in Classrooms

Increase in Online and Blended Learning

Smart Campuses
Conclusion: an incremental approach to ICT in EMIS

- Political Commitment
- Basic ICT infrastructure
- Simple but efficient technology
- Human Capacity Development
- Pilot and Scaling

A vision for national EMIS
An incremental approach
Continuous ICT development and support
Scale and transition into futuristic EMIS
Thank you

Learn more: www.unesco.org/education

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Jonghwi Park, Programme Specialist
ICT in Education, UNESCO Bangkok
j.park@unesco.org
en.unesco.org/themes/education-21st-century
A snapshot of EMIS in Central Asia
Education Data Debates in Central Asia

**Collection**
- Efficient v/s Comprehensive EMIS

**Utilization**
- Top-down v/s Bottom-up approach for decision making

**Reporting**
- Global (SDG4) indicators v/s thematic indicators
Education Data Issues in Central Asia

- Need for a more comprehensive and reliable EMIS (collection)
- Need to use available data for decision-making (utilization)
  - Public, schools, stakeholders. Not just Ministry or policy makers.
- Need for better reporting of Key Indicators (SDG 4) (reporting - global and thematic indicators)
Tajikistan

Source: National Strategy of Education Development of the Republic of Tajikistan till 2020

Recognizes the importance of EMIS

Drawbacks of current EMIS

- only general secondary education is covered by EMIS
- lack of data base management
- system needs modernization and upgrade

main tool to improve the efficiency of education management

a requirement for effective strategic planning, policy analysis, monitoring and evaluation.
Tajikistan

STATUS OF EMIS (2017)

Enabling Environment
- strong policies and processes at the central and local level
- strong legal framework
- need for creation of a data driven culture
- need for training and professional development activities

System Soundness
- captures basic demographic data on students and teachers
- need for integration of non-education data
- need for continuous feedback to schools
- need for advanced data analysis

Quality Data
- concepts, classifications, and definitions documented in official manuals
- need for stronger validation mechanisms
- need for external audits

Utilization for Decision Making
- embedded in policy framework
- need for increased data awareness
- need for greater internet access and stronger communication

Uzbekistan

EMIS Challenges

- absence of unified data collection system
- lack of transparency
- lack of an efficient monitoring system
- lack of disaggregated data
- limited reporting on children with disabilities
- lack of routine indicator generation

Source: UNICEF, 2017
UNESCO’s Open Education Management Information System (EMIS) was introduced as an effective means to collect and analyze education-related data in policy-making. UNICEF has been supporting the Government of Uzbekistan in the development of a robust Education Management Information System (EMIS) for monitoring preschool education development. Need for better coordination on development assistance.

Source: UNESCO, 2013; UNICEF, 2018