Re-imagining the future of Education Management Information Systems
Ré-imaginer l'avenir des systèmes d'information pour la gestion de l'éducation

Day 2 / Jour 2
Day 2

Session 2: Capacities and approaches for the future EMIS

Introduction to Day 2: Satoko Yano, UNESCO

a) Shiloh Naiken, South Africa
b) Francesca Pinna, UNESCO
c) Alpha Bah, The Gambia
d) Eng. Ruba Omari, Jordan

Session 3: Frontier technologies to leverage for the future EMIS

a) Avi Sharabi, KPMG Sydney
b) Dai Shen, Weidong Cloud Education Group
c) Ali Al Yafei, UAE
d) Stéphan Vincent-Lancrin, OECD
e) Louise Macquet, Microsoft
Futures of EMIS
Re-imagining data systems beyond head counts
Traditional EMIS was not suitable to meet the emerging data challenges.

Countries and development partners are committed to filling the data gaps.
<table>
<thead>
<tr>
<th>Key Takeaways for Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Real-time data</strong></td>
</tr>
<tr>
<td>2. EMIS to support <strong>learning</strong> in hybrid systems</td>
</tr>
<tr>
<td>3. Data system to capture <strong>processes</strong> (e.g., attendance)</td>
</tr>
<tr>
<td>4. <strong>Individual data</strong></td>
</tr>
<tr>
<td>5. Leveraging technologies for better <strong>integration</strong> &amp; <strong>interoperability</strong></td>
</tr>
<tr>
<td><strong>Equitable data coverage</strong></td>
</tr>
<tr>
<td><strong>Sector-wide coverage (ECCE, TVET)</strong></td>
</tr>
<tr>
<td><strong>Monitoring of well-being of students and teachers</strong></td>
</tr>
<tr>
<td><strong>Agreeing on scope of “EMIS”</strong></td>
</tr>
</tbody>
</table>

- Hybrid approach to data collection
- EMIS, household survey data
- Possible for countries to have a system
- Day 2!
Day 2 Overview and Objectives – Looking in to the Future

**Day 2** 27 May 2021, 13:30 - 15:30 (CET)

**Introduction to Day 2**
- **Satoko Yano**
  Programme Specialist, Section of Education Policy
  UNESCO

Moderator (Session 2)

**Stéphan Vincent-Lancrin**
Senior Analyst and Project Leader
OECD

Moderator (Session 3)

**Borhene Chakroun**
Director, Division for Policies and Lifelong Learning Systems
UNESCO

**Session 2: Capacities & Approaches**
- **Shiloh Naiken**
  Chief Information Officer
  Department of Basic Education, South Africa

**Session 3: Frontier Technologies**
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  Data Partner
  KPMG Sydney

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  Education Project Officer
  UNESCO

- **Dai Shen**
  Senior Vice-President
  Weidong Cloud Education Group

- **Alpha Bah**
  Head of EMIS and ICT units
  Ministry of Basic and Secondary Education, The Gambia

- **Ali Al Yafei**
  ICT Advisor
  Minister of Education, UAE

- **Ruba Omari**
  Director
  The Queen Rania Center for Education and Technology, Jordan

- **Stéphan Vincent-Lancrin**
  Senior Analyst and Project Leader
  OECD

- **Stéphanie Macquet**
  Cloud Business Development Lead
  Microsoft

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- What should future EMIS look like?
- What are the key capacities and approaches needed to operationalize future EMIS?
- How can future EMIS leverage advanced technologies?
Thank you

Learn more: www.unesco.org/education

@UNESCO

Satoko Yano, Section of Education Policy
UNESCO
s.yano@unesco.org
Session 2: Capacities and approaches for the future EMIS
LEVERAGING THE LESSONS LEARNED FROM THE COVID-19 SOUTHERN AFRICAN EXPERIENCE

Shiloh Naiken
1. The South African School Landscape
2. 2020 – Reflections
3. Leveraging of systems and data
4. The accelerated future
2020 – REFLECTIONS EMIS PERSPECTIVE

**Policy**
- Strong and established data management (collection, protection and sharing) policies across the sector but lacked collection of real-time data.

**Finances**
- Operational budgets cuts to fund PPEs for sector and economic stimulus. Difficult to enhance systems. Ring-fenced the modernisation of EMIS Systems.

**Resources**
- Operational impact due to lock-down – Resources equipped. Verification at school level.

**Data Management**
- Data awareness
- Mandatory
- Verifiable

**Supporting Systems**
- Lack of adaptability & agile
- Integration, data verification
- Common centralised system
- Mobile solutions for data collection

**Digital Access**
- Inter-governmental dependencies
- Basic infrastructure challenges
- Blended approach on/off line
- Seamless offline solution

**Every child is a National Asset**
Despite the challenges, EMIS supported the sector in two key areas:

**Differentiated risk adjusted approach to re-opening of schools**
- Utilising the district health risk alert levels – a spatial dashboard was developed to plot each school against this risk areas.
- Developed a risk alert level response to returning learners and educators to schools
- Successfully defended 8 of 9 legal challenges
- Data shared with other government entities

**School readiness for reopening**
<table>
<thead>
<tr>
<th>Risk Alert Level</th>
<th>Risk Conditions</th>
<th>Mitigating Actions</th>
<th>Mandatory Requirements</th>
</tr>
</thead>
</table>
| 1                | Low virus spread, high health system readiness | • All learners and educators return to school.  
• Work with Home Education Associations to support learners.  
• Provide Online/Virtual Learning  
• NSNP provision arranged for learners who are in need on **staggered timeframe** arrangements to comply with **social distancing**.  
• Re-arrange **School day Programme/Timetable** to accommodate different grades/learners attending school on alternate days as well as **platooning/shift arrangements** to comply with social distancing. | MEETING COVID-19 CONDITIONS FOR RESUMING ACTIVITY WHICH WOULD INCLUDE:  
• Basic Hygiene and Sanitation.  
• Social Distancing.  
• Wearing of facial masks by all.  
• Daily screening. |
| 2                | Moderate virus spread, with high readiness | • All Grades return to school.  
• Arrange for **Learner Support Programmes** for learners who are at home. Provide work and manage feedback.  
• Work with Home Education Associations to support learners.  
• Provide Online/Virtual Learning  
• NSNP provision arranged for learners who are in need on **staggered timeframe** arrangements to comply with **social distancing**.  
• Re-arrange **School day Programme/Timetable** to accommodate different grades/learners attending school on alternate days as well as **platooning/shift arrangements** to comply with social distancing. | |
| 3                | Moderate virus spread, with moderate readiness | • ECD, Grades R to 7, 11 and 12 return to school  
• Arrange for **Learner Support Programmes** for learners who are at home. Provide work and manage feedback.  
• Work with Home Education Associations to support learners.  
• Provide Online/Virtual Learning  
• NSNP provision arranged for learners who are in need on **staggered timeframe** arrangements to comply with **social distancing**.  
• Re-arrange **School day Programme/Timetable** to accommodate different grades/learners attending school on alternate days as well as **platooning/shift arrangements** to comply with social distancing. | |
| 4                | Moderate to high virus spread, with low to moderate readiness | • Grades 12 and Grade 7 return and possible phasing in of remaining grades  
• Arrange for **Learner Support Programmes** for learners who are at home. Provide work and manage feedback.  
• Work with Home Education Associations to support learners.  
• Provide Online/Virtual Learning  
• NSNP provision arranged for learners who are in need on **staggered timeframe** arrangements to comply with **social distancing**.  
• Learners can collect the NSNP in a staggered timeframe for the school and all **daily lessons can be collected / completed homework returned** | |
| 5                | High virus spread, and/or low readiness | • All Schools will be closed  
• All grade 12 learners must be taken to special camps till they complete examinations  
• Arrange for Learner Support Programmes such as giving work to learners and get it controlled.  
• Work with Home Education Associations to support learners.  
• Provide Online/Virtual Learning.  
• NSNP provision arranged for learners who are in need on staggered timeframe arrangements to comply with social distancing. | |
## Application of the Risk Alert Level Response Criteria
### National View

<table>
<thead>
<tr>
<th>Category</th>
<th>Vigilance</th>
<th>Emerging Hotspots</th>
<th>Hotspots</th>
<th>High Risk Hotspots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Schools</td>
<td>5845</td>
<td>2583</td>
<td>4332</td>
<td>4794</td>
</tr>
<tr>
<td>Secondary Schools</td>
<td>2339</td>
<td>1141</td>
<td>1689</td>
<td>1289</td>
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<tr>
<td>Combined Schools</td>
<td>1007</td>
<td>624</td>
<td>637</td>
<td>516</td>
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<tr>
<td>Special School</td>
<td>79</td>
<td>52</td>
<td>127</td>
<td>242</td>
</tr>
<tr>
<td>Educators</td>
<td>130872</td>
<td>72840</td>
<td>118092</td>
<td>118627</td>
</tr>
<tr>
<td>Learners</td>
<td>3914615</td>
<td>2192922</td>
<td>3719905</td>
<td>2876421</td>
</tr>
</tbody>
</table>

- **Vigilance**: All learners and educators return to school.
- **Emerging Hotspots**: ECD, Grades R to 5, 7, 8 to 12 School of Skills Year 1 to 4 and Schools for Learners with Severe Intellectual Disabilities (SID) Grades 1 to 6 Special Care Centres for Learners with Severe and Profound Intellectual Disabilities (LSPID) Year 1-3 return to school.
- **Hotspots**: ECD, Grades R – 3, 7, 10, 11, 12 School of Skills Year 2, 3 and 4, Schools for Learners with Severe Intellectual Disabilities (SID) Grades R, 1, 2, 3, 6 and Special Care Centres for Learners with Severe and Profound Intellectual Disabilities (LSPID) Year 1-3 return to school.
- **High Risk Hotspots**: Grades 12, Grade 7 and School of Skills Year 4 return to school.
Despite the challenges, EMIS supported the sector in two key areas:

### Differentiated risk adjusted approach to re-opening of schools
- Utilising the district health risk alert levels – a spatial dashboard was developed to plot each school against this risk areas.
- Developed a risk alert level response to returning learners and educators to schools.
- Successfully defended 8 of 9 legal challenges.
- Data shared with other government entities.

### School readiness for reopening
- Manual approach for the data collection across 14 key indicators.
- Resource intensive – weekly 2/3-hours reporting meetings with each of the 9 Provincial Education Departments.
- Weekly data converted into a dashboard.
- Developed a WhatsApp solution for easy reporting.
### 1. Facilities
- What is the total number of schools in the province? 3711
- Number of schools that are ready to accept learners on 8 June 2020 3711 / 3711
- Number of schools that have cleaners appointed? 3711 / 3711
- Number of schools that are in readiness for re-opening? 3711 / 3711
- Number of schools vandalized? 115
- Number of vandalized schools reported? 114 of 115
- Number of schools not ready to open due to vandalism? None

### 2. Water
- Number of schools requiring water? 328
- Number of schools that have received water? 316 of 328
- Number of schools providing water and water tanks? 524
- Number of schools provided with water and water tanks? 233 of 524

### 3. Sanitation
- Number of schools requiring immediate temporary sanitation facilities? 453
- Number of schools that have received immediate temporary sanitation facilities? 21 of 453
- Number of schools requiring immediate temporary hand washing facilities? None
- Number of schools that have received immediate temporary hand washing facilities? None

### 4. Basic Sanitation and Hygiene package
- Number of schools that received at least 2 cloths masks/learner (for grade 12 or grade 7)? 3711 / 3711
- Number of special schools that have received face masks/visors/sanitisers? Confirmation in progress
- Number of schools that received hand sanitizers? 3711 / 3711
- Number of schools that received thermometers? 3711 / 3711

### 5. Special Schools
- Number of special schools for learners with severe intellectual disabilities? 26
- Number of schools for learners with severe intellectual disabilities that are ready for re-opening (orientation of care givers, cleaning of facilities, provision of masks/visors, sanitizers and thermometers)? Confirmation in progress
- Number of schools of OSIF? 29
- Number of schools of OSIF that are ready for re-opening (orientation of care givers, cleaning of facilities, provision of masks/visors, sanitizers and thermometers)? Confirmation in progress
- Number of special schools for learners with profound intellectual disabilities? 26
- Number of schools for learners with profound intellectual disabilities that have are ready for re-opening (orientation of care givers, cleaning of facilities, provision of masks/visors, sanitizers and thermometers)? Confirmation in progress

### 6. Screening
1. Number of schools provided with guidelines, manuals, and protocols for screening 3711 / 3711
2. Number of schools that have screeners appointed 3711 / 3711

### 7. Learner Transport
1. Total number of grade 12 and grade 7 learners that are provided with learner transport? 7369
2. Due to social distancing, what is the number of additional vehicles required to transport grade 12 and grade 7 learners? None
3. Number of vehicles provided with COVID-19 essentials (State provided transport) 290 of 290

### 8. School Nutrition Program
1. Number of schools that are providing NVP 3635
2. Number of schools that have received food supplies for once schools open Confirmation in progress
3. Number of schools that have received new protocols and guidelines for feeding 3625 of 3635

### 9. Orientation
- Number of school management teams orientated? 3711 / 3711
- Number of schools where all teachers have been orientated? 956 of 3711
- Number of schools where all non-teaching staff (cleaners, food handlers, cleaners, admin staff) have been orientated? 3711 / 3711
- Number of schools where grade 12 and 7 learners have been orientated? Confirmation in progress
- Number of schools where all learners transport drivers have been orientated? 290 of 290

### 10. Educators and Non-Educators
1. Number of teachers identified with Comorbidities Confirmation in progress
2. Number of health and child welfare workers available to substitute the teachers with Comorbidities 925
3. Number of non-teaching staff with Comorbidities Confirmation in progress

### 11. Learners
1. Total number of learners in Grades 7 138 440
2. Total number of learners in Grades 12 83 374
3. Number of schools that have processes that will support learners with comorbidities who will be at home? 3711 / 3711
4. Number of parents who applied for Home Education as a result of Covid-19 Confirmation in progress
5. Number of learners who have been registered for Home Education as a result of Covid-19 Confirmation in progress

### 12. Psychosocial Support to Learners and Staff
1. Number of Psychosocial support staff at Provincial level 6
2. Number of functional District based support teams 10
3. Number of Functional School based support teams 2377
4. Psychosocial support professionals from NGOs? N/A
5. Psychosocial support professionals from Social Development and Health Yes

### 13. Curriculum and Exams
1. The revised Annual Teaching Plans have been distributed to district  Yes
2. The revised Annual Teaching Plans have been distributed to schools  Yes

### 14. Communication
1. Number of school where communication has gone out to parents about new school operating procedures during the COVID-19 pandemic? 3711 / 3711
2. Number of languages used in the different modes of communication 5
"Too often we give children answers to remember rather than problems to solve."

Roger Lewin
THE ACCELERATED FUTURE – EMIS MUTURITY

Foundation for Information
Observation: discrete objective facts, figures

Data with context
Contextualised, categorised, calculated condensed

Information with understanding
Seeing information form different perspectives, pattern recognition

Information for meaning
Connections, comparisons, consequences, conversations and story telling

Knowledge with insights for action
Actionable intelligence, mega pattern scenarios for changing behaviour

DATA

Transitional or survey systems for generation or collection of data

Reporting and dash boarding

Data Analytics

INTERPRETATION

ARTIFICIAL INTELLIGENCE OR MACHINE LEARNING

Value

Big Data Analytics and predicative behaviours

KNOWLEDGE

FUTURE

Provides purpose within a set of best practice principles on the actions to a specific direction

PAST

Provides context, meaning and insights to understand relationships and patterns
Shiloh Naiken
Cell: +27 83 785 4769
Email: Shilohn@nect.org.za
LinkedIn: Shiloh Naiken
ADDITIONAL INFORMATION
## Application of the Criteria – Eastern Cape

<table>
<thead>
<tr>
<th></th>
<th>Vigilance</th>
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<th>High Risk Hotspots</th>
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</thead>
<tbody>
<tr>
<td>Primary Schools</td>
<td>1 566</td>
<td>710</td>
<td>786</td>
<td>503</td>
</tr>
<tr>
<td>Secondary Schools</td>
<td>344</td>
<td>170</td>
<td>187</td>
<td>198</td>
</tr>
<tr>
<td>Combined Schools</td>
<td>410</td>
<td>376</td>
<td>174</td>
<td>53</td>
</tr>
<tr>
<td>Special School</td>
<td>9</td>
<td>6</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Educators</td>
<td>21 914</td>
<td>15 815</td>
<td>12 381</td>
<td>15 916</td>
</tr>
<tr>
<td>Learners</td>
<td>620 398</td>
<td>464 666</td>
<td>219 210</td>
<td>60 658</td>
</tr>
</tbody>
</table>

All learners and educators return to school.

ECD, Grades R to 5, 7, 8 to 12 School of Skills Year 1 to 4 and Schools for Learners with Severe Intellectual Disabilities (SID) Grades 1 to 6 Special Care Centres for Learners with Severe and Profound Intellectual Disabilities (LSPID) Year 1-3 return to school.

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Grades 12, Grade 7 and School of Skills Year 4 return to school.

The cumulative positivity rate was 21,0% in the province, with Joe Gqabi having the positivity rate which was 28,8% followed by Chris Hanl (27,6%) and NM Metro (26,8%). The highest incidence risk rate (infections per 100 000 persons) was observed in two districts, i.e. Joe Gqabi (53.7) and Sarah Baartman (68.7%).
EMIS SOLUTION

CORE BUSINESS PRODUCTS

Communications and Notifications
Management of school communication and notifications to parents, school governing body and other stakeholders.

Setup and Admin
Manage the setup of a school and managing changes to the school profile.

Curriculum
Defining and managing the school curriculum and reporting on curriculum coverage.

Educator
Manage the administration and management of educators' and staff information.

Learner
Register and manage of learners' personal and academic details.

Accommodation
Manage hostel accommodation for learners.

Transportation
Manage the transportation services provided to learners.

Incident Management
Manage the logging and resolution of incidents raised in relation to learners, educators, school infrastructure and governance.

School Governing Body
Manage SGB activities in alignment with the South African Schools Act.

Library
Manage procurement, rental and collection of library resources.

Assets
Manage procurement, use, maintenance and disposal of the school assets.

Learning and Teaching Support Material (LTSM)
Manage procurement, distribution and collection of LTSM.

School Infrastructure
Manage infrastructure of the school, including buildings, sanitation and other facilities.

CORE FUNCTIONAL PRODUCTS

Document management
Management of all documents generated, uploaded and utilised into and by the SA-SAMS system.

Dashboarding and Reporting
Integrated into DDD - generating predefined and customised reports and real-time dashboards.

Case management
A predefined, collaborative process that is aimed at resolving incidents, problems, request or proposals.

Property and Asset Management
Management of the school property and the assets acquired by the school.

Task and Schedule management
Task and schedule management product is an easy schedule resource and time allocation, progress tracking and baseline analysis.

Financial Management
Manage the finances of the school.

CORE SYSTEM PRODUCTS

Master Data Management (MDM)
MDM is a comprehensive method used to consistently define and manage the critical data of the school to provide a single reference point. Source for DDD

Workflow engine
Manages complex processes, organises and tracks the implementation of workflows.

Business Rules Engine
Automatically executes one or more predefined business rules.

User Administration
An authentication feature that provides the ability to create and control the state of users/logged into the system, allowing the restriction and access to data and functions.
EMIS TECHNOLOGY STACK

- Packaged software
- OS and Application Stack

Software as a Service
- SaaS
  - Curriculum set-up
    - Lesson plans
    - SGB Reports
  - Offline capability with data stored in the device and seamlessly uploading when connected via a data free application

OS & development Application Stack
- PaaS
  - Incident management
  - Attendance
- IaaS
  - Server Storage
  - Accessible by Infrastructure and networks
  - Accessible by developers and testers

Accessed by Users

School set up
- Start of school year
- Financial management
- School Administrator
THE SIGNIFICANT BENEFITS OF EMIS MODERNISATION

**Department of Basic Education**

Driving national policy to improve the quality of teaching and learning for 418,613 educators and 12,033,565 learners.

**Provincial Education Departments**

Adequately appropriating R246.8 billion across 9 provinces for provisioning of educational resources at over 25,574 schools.

**District managers**

Supporting District managers in 86 districts to provide professional management to educators.

**School Governing Body**

Over 25 million parents/guardians actively participating in the running of schools through the School Governing Body.

**School principals and HODs**

Enabling over 100,000 school principals and HODs to effectively manage the teaching and learning activities of the school.

**Educators**

Reducing administrative burden will free up 40 million hours per year for educators to provide quality teaching to our country's future leaders.

**School administrator**

Over 25,000 school administrators supporting the teaching and learning activities and environment.

**Inter-governmental Departments and Regulatory bodies**

Extending the benefits of e-Government for collaborative information sharing across all sectors.
SA-SAMS MODERNISATION ASPECTS: OLD VS NEW

User support
- Physical
- Self service

Policy adoption in system
- Complex adoption
- Simple adoption

User experience
- Incongruous flow
- Intuitive flow

Technology platform
- Rigid and limited
- Scalable and flexible

Application Mobility
- No mobility
- Easily mobile

Consolidating information
- Error-prone and time consuming
- Reliable, customised and timeous
WhatsApp Solution
TeacherConnect

TeacherConnect is a free real-time chat-based learning and mentorship platform for teachers, learners & education.
**TeacherConnect - The Vision**

- **Connect** - Providing a WhatsApp chat-based, mobile support line available 24/7 to all teachers
- **Helpdesk** - AI-powered helpline providing immediate answers and links to information
- **Learning** - Curriculum of E3 pedagogy in mobile format accessible via WhatsApp
- **Mentoring** - Coaching and peer-based support and guidance
- **Tracking** - Real-time dashboards
TeacherConnect and HealthCheck

**Step 1** Daily Screening

Teachers will be encouraged to do a daily HealthCheck through their channel of choice.

**Step 2** Risk Classification

Once the check has been completed, actions are suggested based on NICD and NDOH guidelines.

- **SELF ISOLATE**
- **TEST**
- **SEEK EMERGENCY CARE**

**Step 3** Verification

Before entering campus, students and staff must show that they have completed the daily HealthCheck and are cleared to continue onto campus.

**Step 3** Follow Up

For those students and staff who have been classified as moderate or high risk, they will be entered into the NDOH tracking and tracing process.
TeacherConnect reporting dashboards

HealthCheck Risk levels

- HighRisk
- MidRisk
- LowRisk

Total HealthCheck users: 1,569,748

Current HealthCheck platform usage:
- 60% USSD (sms)
- 40% WhatsApp

Self-Assessments to date: 4,547,410
STRENGTHENING EMIS AND DATA FOR INCREASED RESILIENCE TO CRISIS

International Seminar on Re-imagining the future Education Management Information Systems

Session 2: Capacities and approaches for the future EMIS
Learning from Covid-19 and beyond

Impacts of Covid-19 echo the challenges systematically faced by education systems in contexts of emergencies and protracted crises

- Lack of prioritisation of education
- Exacerbation of vulnerabilities of learners and educators
- Increased risk of permanent school exclusion and social marginalisation

Quality, timely data needed to:

- Understand barriers, needs, and inequalities
- Design responses for all

How can EMIS be used to inform all phases of crisis preparedness, response and recovery whilst building longer term resilience?
Project Background

The Education 2030 Framework for Action

UNESCO’s commitment to Strengthen capacities of education systems to prepare for, mitigate and respond to the impacts of crises on education, and ensure quality, safe and continuous education for all.

- **Apr. 2018:** UNESCO-GPE International Conference on EMIS
- **Oct. 2019:** EMIS in Emergency Contexts - UNESCO Regional Bureau for Education in the Arab States
- **Jun. 2019:** EiE Data Summit NORRAG, INEE, USAID
- **Sept. 2019- Jan. 2020:** Six country case studies were conducted in Chad, Ethiopia, Palestine, South Sudan, Syria and Uganda
- **Mar. – Jul. 2020:** Findings of case studies consolidated in a background paper to inform the next phase
- **Jan 2021- Jan. 2024:** Implementation of recommendations in three pilot countries
- **Sept. 2020:** Virtual Partners’ Forum

Strengthening EMIS and Data for Increased Resilience to Crises
STRENGTHENING EMIS AND DATA FOR INCREASED RESILIENCE TO CRISES

Six Country Case Studies

CHAD

ETHIOPIA

PALESTINE

SOUTH SUDAN

SYRIA

UGANDA
STRENGTHENING EMIS AND DATA FOR INCREASED RESILIENCE TO CRISES

Six Country Case Studies

To protect learners and education workers
To plan for education continuity
To safeguard education sector investments
To strengthen education system resilience through risk-informed planning
Main Findings

The use of EMIS in its present form for EIE is limited because of challenges related to timeliness, quality, relevance, availability

- Duplication and/or fragmentation of data
- Weak coordination around data sharing and use
- Inefficient use of resources, both human and financial
Why...

Institutional Environment
- Legal, Policy and Institutional Frameworks
- Capacities (Human, technical and financial)

Data Production
- Coverage (geographical, target groups, scope)
- Timeliness, Accuracy and reliability

Data dissemination and use
- Availability and accessibility
- Coordination of data sharing for joint assessment, planning and monitoring
Crucial considerations to enhance EMIS for increased resilience to crisis

• **Context specificity, co-ordination and sustainability are the critical core of all EMIS enhancements.**

• Ensuring that data collected are harmonized, rationalized and **utilized** and translated into meaningful and visible change needs to be the collective goal.
Going forward: A comprehensive approach

- Strengthen and link legal, policy and institutional frameworks around EMIS and Education in Emergency
- Build system capacity on crisis-sensitive sector analysis, policy and planning
- Review data collection and processing tools accompanied by training and support to facilitate their use
- Strengthen coordination around data within ministries of education, across line ministries and partners

Countries: Ethiopia, Chad, South Sudan

Logos: UNESCO, Education Cannot Wait, NORCAP, Sida
Thank You!

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EMIS innovation: the Gambia, Uganda, Eswatini

Alpha Bah, MoBSE, The Gambia
The pandemic highlights the need for

- up-to-date and fine-grained baseline information
- responding to changing data requirements
- support decentralized use of data
- support mobile/offline devices
- capacity for local innovation
- synergies across sectors
- leveraging foundational investments:
  - GIS, Census, CRVS, unique IDs, MICS ...
  - Example: Gambia schools by type and location
EMIS Shift

• Greater frequency and greater disaggregation essential to address inclusion, equity and quality education challenge, as ‘what get measured gets done’

• Data electronically collected from schools with option for **offline** mode
Integrating all types of data

**Aggregated data**
- Enrollments by category
- Stocks of learning materials
- Number of inspections (Daily)
- Attendance numbers

**Events**
- Cluster inspections
- Teacher trainings
- Targeted surveys

**Individual data**
- Following learner progress throughout the educational career
- Tracking teacher performance
Open eGovernment platform architecture

- core set of service APIs (school list, teacher registry)
- fully integrated analytics
- wider use of data ↔ demand for quality
- country ownership and platform capacity
- extensions with targeted apps
- framework attracting accumulating innovation
- *Schools are key data sources for multiple sectors:*
  - *e.g.* Nutrition, Social Protection, Water&Sanitation...
Real time/exploratory data analytics

• Common repository allows for comparative analysis and triangulation along variety of dimensions
• Shared analytics enable both expert guidance & interpretations and locally adapted data use
• Daily attendance and performance trends
Example: Eswatini dashboard analytics
Innovation
Daily Teacher Attendance System

- Smartphones with Closed User Group SIM
- VPN connection between DHIS2 and Mobile Operator
- DHIS2 dashboard and analysis tools
- Decentralized system controlled by Regions
- Structured SMS through DHIS2 for those without smartphones/tablets
Platform-based innovation in Uganda: COVID travel certificates powered by the DHIS2 platform

Developed based on stage 3 of the CBS program of the DHIS2 COVID19 package

Extended the Index case app to add the list of exams

PDF files with digital signatures and barcodes are generated by health professionals

Use cases in Rwanda, Uganda and Guinea Bissau for generating COVID-19 test certificates & travel passes for travelers.
Read more at: dhis2.org/covid-success-stories

Disclaimer: Data in screenshots are for demo purposes only; they do not represent real people nor real details
Platform-based innovation in Sri Lanka:
Full national Covid Vaccine Registry offline/online
Challenges and ways forward

- Fragmentation amongst actors for data collection, processing and reporting
- Interoperability costly/complex with many stakeholders and organizational jurisdictions => needs high level vision
- Cost of reaching «last miles»: schools, teachers, students, community
  - 3 key drivers to be addressed: devices, connectivity, training
- Take SDG process to guide inter-sector collaboration
- Build demand for data, as part of micro planning, M&E, eg School Report Cards
- Strong foundation for early scaling of simple, high-benefit functions
- EMIS ecosystem institutionalization:
  - bring in local universities, internships
  - shifting focus to learning outcomes at all levels
- Exploit cross-sectoral synergies, pooling local capacity and infrastructure
JORDAN’S MINISTRY OF EDUCATION
INTERNATIONAL SEMINAR ON RE-IMAGINING
THE FUTURE EDUCATION MANAGEMENT
INFORMATION SYSTEMS

“BEYOND HEAD COUNTS: LEVERAGING DATA
SYSTEMS TO SUPPORT INCLUSIVE AND
EFFECTIVE LEARNING FOR ALL”
Day 2: Thursday May 27, 2021

Session 2: Capacities and approaches for the future EMIS

This session will explore technical, human, and financial capacities required for an effective EMIS in Jordan.
EMIS in Jordan

Background

Jordan’s EMIS Implementation Timeline

Before 2014

- Before OpenEMIS, Jordan’s MoE adopted and used EduWave as the formal EMIS.

2014 - 2016

- OpenEMIS was first supported in Jordan in 2014 through EU funding and UNESCO technical support (Phase I of OpenEMIS in Jordan).
- EduWave was still operational while OpenEMIS is being customized and tested, until 2016 when OpenEMIS was officially launched.

2017

- By end of 2017, OpenEMIS is fully customized and operational as per Phase I of MoE Requirements (Data Fields, Reports, Workflows, Data Management Tools), with capacity development approach.
- OpenEMIS linkage with: CSPD (Civil Status & Passports Department).

2018 - 2019

- A comprehensive assessment of Jordan’s EMIS was conducted using the SABER-EMIS assessment methodology.
- SABER-EMIS classified and analyzed existing EMIS's based on four policy areas: 1- The enabling environment; 2- System soundness; 3- Quality of data; 4- Utilization of data for informed decision making.
- The outcomes of the assessment led to the consolidation of a clear EMIS roadmap.

2020 - 2021

- This roadmap was reflected into a concrete EMIS Operational Plan for Jordan’s MoE for (2020-2022). The plan represents Phase II of OpenEMIS in Jordan.
Jordan’s EMIS
Enabling Environment & Sustainability
Key elements
<table>
<thead>
<tr>
<th>Capacity Type</th>
<th>MoE Level</th>
<th>Capacities for EMIS in Jordan</th>
</tr>
</thead>
</table>
|                                    | School, FD & Central MoE     | • Accessing OE and performing the required functionalities as per the user’s role  
• Data entry follow ups, data validation and monitoring according to the user’s role.  
• Capturing, reporting and following up technical/use issues related to OE.  
• Conduct non-technical EMIS trainings (End user).  
• Utilizing EMIS data to inform decisions, according to the user’s role. |
| EMIS Usage Capacity                 | Central MoE                  | • Administer OE application.  
• Fully utilize OE Data Management tools.  
• Assess and monitor OE data quality, integrity, accuracy and reliability.  
• Produce data analysis reports and statistical digest.  
• Manage & update OE software development process (SoPs).  
• Manage OE upgrade process (Upgrade SoPs).  
• Manage and maintain OE Database & Application Servers.  
• Manage and maintain OE Hardware Platform.  
• Develop OE disaster recovery and risk management plans. |
|                                    | School & FD                  | Maintain school’s technological infrastructure.                                                                                                                                                                             |
| EMIS Technical & Operational Capacity| Central MoE                  | • Establish and maintain strong MoE EMIS coordination structures (EMIS TC).  
• Develop and manage MoE plans for OE infrastructure/networking in the MoE.  
• Develop EMIS data collection progress and monitoring/follow up plans.  
• Assess OE training needs and develop training plans.  
• Manage the EMIS robust scoping tasks to capture and analyse EMIS requirements and develop/implement EMIS Operational Plans (EMIS Technical Committee).  
• Manage and sustain integration plans with internal and external systems.  
• Develop and implement emergency and crisis sensitive plans linked to EMIS.  
• Manage the process of planning the second line of support to OE SW and HW (ToRs and Procurement follow ups).  
• Develop yearly MoE EMIS budget plan  
• Develop MoE EMIS visibility strategy  
• Develop, operationalize and sustain EMIS policy (MoE EMIS Policy Technical Committee). |
### Element (2): MoE Organizational Structure & Processes

<table>
<thead>
<tr>
<th>Previous/Existing Challenges</th>
<th>Measures/Actions/Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unclear defined structure for EMIS at the MoE</td>
<td>QRC structure has been reformulated.</td>
</tr>
<tr>
<td></td>
<td>A robust coordination mechanism was established at the MoE (EMIS Technical Committee).</td>
</tr>
<tr>
<td></td>
<td>MoE EMIS Policy enforces the necessary distinction between the different EMIS functions at the MoE.</td>
</tr>
<tr>
<td></td>
<td>MoE has developed SoPs for OE Software Development to operationalize standardized process within the MoE.</td>
</tr>
</tbody>
</table>

### Element (3): MoE Human Resources

<table>
<thead>
<tr>
<th>Previous/Existing Challenges</th>
<th>Measures/Actions/Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The EMIS roles and responsibilities are not clearly defined in the ToRs of MoE official units or staff (ex: School EMIS Officer)</td>
<td>- ToRs for the MoE EMIS Profiles are being revised to match the EMIS HR requirements.</td>
</tr>
<tr>
<td>- MoE staff ToRs need to reflect the required specialized EMIS capacities (technical capacity) including the associated qualifications, skills and experience.</td>
<td>- An EMIS Operational Manual was developed to help clarify all EMIS responsibilities linked to all MoE units in alignment with MoE structure and tasks timelines.</td>
</tr>
<tr>
<td>- The difficulty to sustain and keep specialized technical expertise within the MoE.</td>
<td>- The need to define a modality for allocating incentives for staff with specialized technical tasks.</td>
</tr>
</tbody>
</table>
## Element (4): MoE EMIS Budget

<table>
<thead>
<tr>
<th>Previous/Existing Challenges</th>
<th>Measures/Actions/Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• No adequate operational and development budget for OpenEMIS is planned or allocated annually within the MoE budget, resulting in a financial gap that has been addressed through external funds.</td>
<td>• The EMIS policy defines and enforces the main budget lines for EMIS (SW and HW SLA Support Agreements, SW and HW procurement (can be replaced by cloud hosting fees), SW development, OE Helpdesk, OE Trainings).</td>
</tr>
</tbody>
</table>

## Element (5): MoE Legal Framework

<table>
<thead>
<tr>
<th>Previous/Existing Challenges</th>
<th>Measures/Actions/Achievements</th>
</tr>
</thead>
</table>
| • No specific legal framework for EMIS exists. | • EMIS Policy is under development. Final stages. The MoE will develop an action plan to operationalize the policy.  
• EMIS Confidentiality and Fair Use Agreements to be enforced through operationalization of the EMIS Policy.  
• EMIS System and Data access controls are well defined in EMIS Policy. |
### Previous/Existing Challenges

<table>
<thead>
<tr>
<th>Measures/Actions/Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Data center for EMIS at NICThas been established</td>
</tr>
<tr>
<td>• Data center for EMIS at NICThas been upgraded</td>
</tr>
<tr>
<td>• Cloud hosting options for OE are under analysis (cost benefit analysis is conducted)</td>
</tr>
<tr>
<td>• All regional MoE data centers have been connected through a unified network with central ministry network.</td>
</tr>
</tbody>
</table>

### Element (7): MoE Data-Driven Decision-Making Culture

<table>
<thead>
<tr>
<th>Measures/Actions/Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The following dashboards were developed using OpenEMIS tools:</td>
</tr>
<tr>
<td>• OpenEMIS accommodates a static reporting module, serving to generate around 50 static reports on the central and regional levels only.</td>
</tr>
</tbody>
</table>
## Jordan’s experience with EMIS in the context of covid-19

### Re-shaping EMIS in Jordan (Re-prioritization)

<table>
<thead>
<tr>
<th>Top priority: Enhance MoE technological and infrastructural capacity, on all administrative levels, including prioritizing EMIS hosting over the cloud and establishing a unified Education platform.</th>
</tr>
</thead>
<tbody>
<tr>
<td>First version of Jordan’s OpenEMIS Mobile Applications have been developed and introduced to MoE, leveraging the current use of OpenEMIS under the Hybrid Technology.</td>
</tr>
<tr>
<td>MoE WebGIS (SDSS) is being further enhanced to accommodate a Hybrid (mobile-web) Smart School Maintenance Module.</td>
</tr>
<tr>
<td>The MoE has developed a cost-benefit analysis for the different cloud hosting options for OpenEMIS in order to choose the most cost effective and more sustainable option.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top priority: Full integration between OpenEMIS and the LMSs adopted by the MoE (DARSAK and NoorSpace) as well as other Educational data systems like UNRWA and UNHCR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpenEMIS APIs are being developed through a capacity building approach to allow integration with other systems (Darsak LMS, NoorSpace, UNHCR Data Model, UNRWA Data, MoE WebGIS).</td>
</tr>
</tbody>
</table>
## Jordan’s experience with EMIS in the context of covid-19

<table>
<thead>
<tr>
<th>Re-shaping EMIS in Jordan (Re-prioritization)</th>
<th>Strengths/Achievements</th>
</tr>
</thead>
</table>
| ✓ Top priority: Improve EMIS system soundness, and data quality, reliability and accuracy. Zero tolerance for incomplete, incorrect or outdated data on OpenEMIS. | • OpenEMIS Data quality has proven to be fairly accurate, upon using it to feed DARSAK LMS. However, the need for zero discrepancy (to allow inclusive access for students) of OE data on DARSAK has urged schools to update and validate their data on OE.  
• However, data gaps still exist and therefore, EMIS Data Quality Monitoring Tools are planned to be developed. |
| ✓ Top priority: Improve OpenEMIS Static and Dynamic reporting modules | • EMIS OP has planned and on-going activities to improve the existing OE static reporting module and to develop a dynamic reporting module. |
| ✓ Top priority: Strengthened technical and operational EMIS capacities, Time-management skills and the ability to work in crisis-sensitive situations. | • The MoE EMIS Operational Plan that is being implemented is based on a solid and well-defined capacity development approach, including associated roles and responsibilities. |
Thank you

Learn more:
http://moe.gov.jo
Session 3: Frontier technologies to leverage for the future EMIS
Re-imagining the future Education Management Information Systems

Data democratization and technology evolution: implications to education (art of the possible)

May 2021
Contents

• Trends in MIS & Technology
• How Public/Private sectors benefit from new technology
• Impact of new technology evolution on Education
  • Barriers to adoption
  • A vision for the future of Education
Trends in MIS & Technology
Data democratisation and technology evolution

- Quantum Computing
- IoT
- Robotics
- AI and Machine Learning
- Automation
- Cloud Computing
- Mobile Apps
- Cyber

Social development
Technology development
Big data

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Document Classification: KPMG Confidential
How Public/Private sectors benefit from new technology

Natascha Viljoen
Impact of technology evolution on public/private sectors

Security
Use big data and advanced analytics tool to predict risk events, fraud, and the ability to prepare for such events. Simulate and improve response planning.

Transport
Ability to use big data/social media to predict traffic in train stations + use AI to simulate and dynamically impact appropriate workforce.

Health
Access to personal (protected) patient record, maximise collaboration, cost and improve service across multiple health related agencies. Introduction of TELE Health and advanced screening chatbots.

Financial services
• Have better and more tailored interaction with customers
• Predict customers at risk early on and response in time
• Predict customers’ behaviour and propensity for new offering

Construction & Commercial Real Estate
Using IoT devices to assist with predictive asset management.
Impact of a new technology evolution in education
Barriers to adoption
We must address a number of barriers to improve learning and teaching delivery

Manual school and student administration processes
Manual tasks, too much time is spent on administration tasks not enough developing and supporting teachers in the classroom.

Fragmented customer experience
Not a clear channel for community (parents/carers) to engage with the school. Data is available to inform student progress.

Administration requirements of teachers
Teachers report spending more time on compliance administrative tasks, thereby reducing the time available to plan, prepare and deliver quality teaching.

Inconsistent access and equity
A wide gap between have and have not from individuals school perspectives.

Disparate data sources
Data sources are usually disparate, not easily accessible or digestible to inform decisions by the departments, schools or communities. Difficult to have a complete single record for a student or a teacher. Integration of information between schools is limited or non existent.
A vision for the future of Education
The education echo systems and enablers for a brighter future

**Enablers**

**Connected systems**
Integrated environment where data flows seamlessly from one system to another

**Access to external information**
Getting to know your students and their life context

**Actionable data**
Ensure that data is of high quality and “fit for purpose”

**Digital capability**
Delivery of information and the ability of teachers/student/community to consume the information

**Security/Privacy**
Ensuring that all relevant profusion are taken place to protect all stakeholders’ rights to privacy

**Engagement with the community**
Enabling the community to engage in the learning process, contribute and understand progression of students
Enabled by increased access to information, availability of advanced analytics, machine learning and utilising digital delivery, our future learning spaces, schools and central functions will significantly change.

As our world moves to a more digitally-enabled future, so too will our future learning spaces and our schools, and, by necessity, the central functions required to enable and support them.

Our future MIS environments will behave very differently than today.

The teacher remains at the centre of teaching and learning, but can readily augment their approach with digital resources.

Across our students and teachers, the future teaching & learning experience is different. Personalised learning and advanced learning diagnostics help students perform at their best. Parent & carer interactions are better supported through improved MIS, and more information is available in real-time to support their children on their learning journey.

Technology enabled learning spaces support a multitude of pedagogical approaches. Information is shared across various learning environments allowing the finding, utilising and sharing of additional curriculum content to be straightforward and enabling the teacher to tailor the learning experience.

Schools have streamlined their administration processes and are generally paperless. Principals spend more time coaching and mentoring teachers and shaping school outcomes. Transactions with the school are online and cashless, and communication tools facilitate targeted messaging. Schools make underutilised spaces available for community activities outside school hours, and connectivity spaces allow students to stay connected.

The department has a school-centric service culture, enabling schools rather than scrutinising them. Its MIS enabled Marketplace provides leading edge capabilities to schools and is regularly evolving. The department assesses progression across multiple schools and jurisdictions and access to with global evolution and trends able to improve the curriculum and learning experience consistently across all schools.
Thank you

Avi Sharabi
Partner
KPMG Australia
1. Vocational training can effectively accelerate transformation from learners to workforce with skills. This is critically needed in less-developed countries.

2. Business models of vocational training is versatile, which means it’s more sustainable in a dedicated-designed ecosystem, rather than solely relying on the government budget.

3. Vocational training targets to serve most of citizens with a wider coverage. It is strongly connected with local industries development.

4. Vocational training is suitable to introduce best practice and content from & to different countries.

5. Suitable for widely application of digital transformation in different industrial trainings.

6. Vocational training is in WEDON’s gene that we can provide full life-circle of vocational training service.

---

1. Vocational training needs precision on workforce market mapping.

2. It requires omni-data inputs from lines of business, collaborations of cross functional divisions.

3. Training scope, content and plan are frequently adjusted according to the needs of trainees.

4. Quality and service level focused.

5. A continuous loop of improvement should be enabled where the big data application can be applied.

6. Underlying data relevance is more complicated in vocational training. But this also proves great social and business values.
The key to ensuring that information is used most effectively, and delivers along the data-information-knowledge continuum, is making sure that any insights to be garnered are easily accessible and easily interpreted. Given the information overload we’re all grappling with these days, visual representations that are quickly understandable and easy to access are essential when it comes to enabling instructors to act on information in a timely and effective manner.

We provide one-stop talent solutions for public sectors, training institutions and enterprises. The platform provides training and learning, evaluation of talents, job recommendation, quality assessment, skillset models, credit rating, etc. Most importantly, the platform support open API to seamlessly converge data across different platforms to generate comprehensive data analysis reports.
It does not only record behaviors of users on learning system, but also provides channels to connect with any 3rd party platform, including educational ERP system, CRM, job-hunting application, etc.

Inbuilt with ready-to-use analysis models. User can adjust variables or design your own analysis models based on the business analytics of local situation. (applicable analysis models will need substantial data collection and validation process)

Insight always comes from the findings based on data analysis. We provide powerful user grouping model enables every people to understand learners more and dig them deeper.
DATA COLLECTION AND APPLICATION PLAN OF PNDAPA PROJECT IN CÔTE D'IVOIRE
PNDPA Project is a national campaign to unite craftsmen and to empower them with formal recognition, systematic organization, decent jobs and improved social position.

The project consists of 4 components, orchestrating together to achieve the social values:

1. Through a national census to prove into the actual demographic of handcraft practitioners, and scope them into a systematic management/organization under the governing of Ministry of Craft.
2. Boost sales of handcraft products via e-commerce portal which is accessible from the world, creating more demand online.
3. Provide formal and digitalized online education for the handcraft learners and enable them work-ready.
4. Build 13 training centers with up-to-date ICT facilities to accommodate the craftsmen to receive formal education.
Beyond the head counts, which means data analysis in vocational training must connect with the current demographic pattern, the workforce market and doable training plan according to the scientific models of skillsets.

The sub-projects of PNDPA projects serve for different goals but aim to the same long-term objective:

○ Through omni-data convergence to perform comprehensive analysis in order to improve the operation, maximize the ROI and strength the industry of handcrafts.
MAJOR DATA SOURCES OF THE SUB-PROJECTS

Data from the National Database of Craftsmen (based on KONOSYS ERP System)
- Data generated through national census on craftsmen and handicrafts classification, facilitated by National Chamber of Trades.
- Identification of masters of handicrafts
- Identification of current skills of craftsmen
- Issues of craftsmen ID cards

Data from the Virtual Gallery
- The data from the sales on E-commerce platform
- The data of approved products and services that will be part of the database of handicrafts
- The data of multimedia studios (Photos / Video) to produce photos and videos for sale
- The data from the Customer Relationship Management (CRM) tool
- The data of craftsmen and craft enterprises approved for mass production

Data from the Learning Platform (WeLMS) and Operations of the training centers (KONOSYS ERP)
- Training Material and courses production
- Attendance, performance and evaluation of trainees
- Skillsets models, training & learning path design and certificates
- Feedback and post-employment survey
- Trainees information, performance and capability models
- Operational data: financial ledge, cash flows, payrolls, etc.
- ...
The supply of the national database of Ivorian crafts starts with the identification of all the roles, trades companies and professional organizations of the sector. This will then allow the National Chamber of Trades of Côte d'Ivoire to carry out registration and registration processes of craftsmen, trades companies and professional organizations of the sector in their respective registers. Registration in the register of trades is now a legal requirement, in application of the Community Code of Handicrafts, for all artisans practicing in the UEMOA area. Registration in the register of trades entitles you to a professional card that provides benefits and is also recognized throughout the WAEMU area. Like craftsmen, the code also obliges trades and professional organizations in the sector to register at the same time in the trade register of chambers of trades as well as in the trade and credit register. Registration will thus enable the actors of the informal sector to be taken out while providing more financial resources to chambers of trades.
Arrangement of Workflow for Data Collection

The stages of identification of craftsmen are:

1. Preparatory activities;
2. Pilot identification;
3. The census cartography;
4. Enumeration of all artisans in Côte d'Ivoire;
5. The post-census survey of coverage;
6. Data processing;
7. The publication;
8. Dissemination;
9. Archiving results.

### Central ERP System
- Department Supervisor
- Controller/Agent to perform craftsmen enumeration
- Central ERP System
- Data Collection Flow
- Data validation and analysis

### Administrative Organization Structure
- Central ERP System
- Côte D’ivoire
- 31 Administrative Regions
- 2 Autonomous Districts
- 108 Departments
- 510 Sub-prefectures
- Enumeration Areas (ZD)

### META DATA OF CRAFTSMEN

<table>
<thead>
<tr>
<th>N°</th>
<th>Zone touristique</th>
<th>Ville Retenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>District D’Abidjan</td>
<td>Abidjan</td>
</tr>
<tr>
<td>1</td>
<td>District autonome d’Abidjan et la Région des grands ponts</td>
<td>Grand-Lahou</td>
</tr>
<tr>
<td>2</td>
<td>Région du Sud Comoé et de l’Agniéby Tiassa</td>
<td>Ablosso</td>
</tr>
<tr>
<td>3</td>
<td>Région de l’indénié Djuabin</td>
<td>Abengourou</td>
</tr>
<tr>
<td>4</td>
<td>Région du Gontougou</td>
<td>Bondoukou</td>
</tr>
<tr>
<td>5</td>
<td>Région de la Vallée du Bandama</td>
<td>Bouake</td>
</tr>
<tr>
<td>6</td>
<td>Région du Poro</td>
<td>Korhogo</td>
</tr>
<tr>
<td>7</td>
<td>Région du Kabadougou</td>
<td>Odinné</td>
</tr>
<tr>
<td>8</td>
<td>Région du Worodougou</td>
<td>Séguela</td>
</tr>
<tr>
<td>9</td>
<td>Région de Yamousskro</td>
<td>Yamoussoukro</td>
</tr>
<tr>
<td>10</td>
<td>Région du Haut Sassandra Marahoué</td>
<td>Daloa</td>
</tr>
<tr>
<td>11</td>
<td>Région du Tonpi</td>
<td>Man</td>
</tr>
<tr>
<td>12</td>
<td>Région de San Pedro</td>
<td>Soubre</td>
</tr>
</tbody>
</table>
THANK YOU!

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MOE UAE Ecosystem
Frontier technologies to leverage for the future EMIS
May 2021
The complete Ecosystem offers the below holistic Technical, User and Pedagogical Views:

In order to achieve the below principles:

- **Availability**: Provide relevant information in appropriate time, regardless of the available information system.
- **Usability**: Extend functions across multiple systems to support and enrich users experience.
- **360 data model**: Consolidate and provide master data management - the single point of truth and consistent information throughout the multiple systems.
- **Artificial Intelligence and Machine Learning**: Provide strong basis for applying artificial intelligence and machine learning. Can be used for offline advanced analytics or on the fly decision making for transactional systems.
The Ministry of Education in United Arab Emirates invested in education and the systems. These systems were planned to be the building blocks of the ecosystem. This includes the following main systems:
ECOSYSTEM THE JOURNEY

FOUNDATIONS/READINESS
- Schools Smart Learning Infrastructure
- Investment in Systems
- Ecosystem Foundations (SIS and LMS)
  - Organizational/
  - Transformational Change

Phase 1

LEARNING MANAGEMENT CONTAINER
- Content Packaging and Launching Standards
- Learning Events and Activities Standards

Phase 2

LMS & SIS INTEGRATION
- Attendance
- Timetable
- Gradebook
- Behaviour
- Events and Calendar
- Surveys Etc.

Phase 3

INTEGRATION and ADVANCED LEARNING PLATFORM
- Information Exchange Standards
- APIs and Integration Layer
- End to end provisioning
- Unified Data Model and Database
- Learning Record Store (LRS)
  - Question Bank

Phase 4

ADVANCED STAGE
- Artificial intelligence
- Adaptive and Personalized Learning
- Advanced Analytics
- 360 degree view – Students, Teachers, Schools
  - Gifted and Talented

Foundation Phase

In Progress
ECOSYSTEM - LEARNING SPACE
TECHNOLOGY ADHESIVE

- Authentication – Single Sign On
- Provisioning
- Integration Layer
  - Enterprise Service Bus (TIBCO)
  - RabbitMQ
  - REST APIs
- Content Library
- Standards
  - Content Packaging and Launching Standards (CC v1.3, Thin CC v1.0, Test Interoperability (QTI v2.2) & Learning Tools Interoperability (LTI v1.3).
  - Information Exchange Standards - One Roster (OR v1.1).
  - Learning Events and Activities Standards: Experience API (xAPI), Caliper Analytics (v1.1).
- Learning Record Store (LRS)
- Unified Database and Data Model (BI, SpotFire etc.)
ARTIFICIAL INTELLIGENCE – TECHNOLOGY FUTURE

ADAPTIVE CONTENT
1. HTML
2. Video, Story
3. Learning outcome / complexity based on student capability

ADAPTIVE SEQUENCE
1. Memorization
2. Recommendation
3. Remediation

ADAPTIVE ASSESSMENT
1. Question Banks
2. Varying degrees of difficulty
3. Automatic delivery based on student performance

SCHOOLS MANAGEMENT AI
1. Student learning experience
2. Teacher teaching experience
3. School operations experience
4. Schools' demographics

BENEFITS FOR LEARNERS
1. Respects prior knowledge
2. Differential abilities
3. Responds to various learning needs
4. Reduces gaps in understanding

BENEFITS FOR TEACHERS
1. New-age teaching tools & aids
2. Perf metrics allows early intervention before student failure
3. Monitor progress & focus on weak areas

BENEFITS FOR INSTITUTIONS
1. For institutions, adaptive learning enables large-scale personalized learning
2. Greater levels of academic success
3. No cheating due to unique content & assessment per student

ADAPTIVE LEARNING
School AI for student Teacher and curriculum experience
Unified Student Record
Captures all student records from birth to lifelong learning to construct unified student records for the country.

Student and e-Learner Portfolio
A complete portfolio to include extra-curricular activities (combined with knowledge, skills, competencies, attributes, dispositions) to facilitate learning strategies and to improve learning outcomes.

Personalized Learning (Future State)
Use of Adaptive Learning to personalize and optimize the learning experience and potential gains.

Virtual Schools
Fully supports Distance learning, blended and hybrid learning.

Emerging Technologies (Future State)
Introducing Artificial Intelligence combined with the underlying big data allows further enhancements for new and emerging technologies to be introduced in the future.

User Experience
More rich user friendly experience, provides a unified user experience with segregation by role to help minimize the navigation between systems.

Optimal use of information and current IT resources
Dynamic curriculum & Assessment delivery with access to a large collection of consolidated learning resources.

Ability to Integrate New systems
Introduction of standard APIs and an Integration layer allows the new systems to be smoothly integrated and data to be readily exchanged.

Advance Analytics and Decision Making
Unifying the system and the data allows improved visibility and more efficient decision making. Provide insights that support decision making by using machine learning to produce predictive and prescriptive analysis of big data.
THANK YOU
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Smart data and digital technology in education: the next-generation EMIS

Stéphan Vincent-Lancrin, Ph.D.
Deputy Head of Division,
Senior Analyst and Project Leader

Centre for Educational Research and Innovation,
Directorate for Education and Skills
System and school levels

- **Longitudinal information systems** create an administrative data infrastructure providing new opportunities:
  - They link individual-level data over time and trace the academic and performance history of each student

- **Next-generation systems** integrate and link (more) administrative, including learning management system data:
  - Incorporate visualisation and learning analytics tools
  - Provide recommendation/diagnosis tools
  - Bank of resources for all stakeholders
OECD/CERI survey covered **67 systems** from **33 countries/economies** (as of 2016):

- A large majority of systems can track students longitudinally
- Less than two thirds of systems provide teacher and course identifiers
- Student- and school-level data matched, but teacher and student data linked only by a third of the systems, mainly US
- Some cases where link does not exist despite availability of both identifiers
Reporting and research data systems

• Statistical reporting and evaluation – from the traditional focus on reporting and accountability requirements

• Accountability of systems and school performance cards enriched thanks to longitudinal, individual-level data

• Reports seek to inform mainly policy makers and the public

• In some cases, also designed to develop research capacity about educational issues

**Canada: Ontario School Information System (OnSIS)**

**Mexico: Sistema Integral de Resultados de las Evaluaciones (SIRE)**
e-Government data systems

- Inspired by e-government approach promoting automated data integration across government agencies
- Data trails generated by the use of digital ID-cards and digital signatures
- Major objectives include making administrative processes more efficient (e.g. school transfer, school choice, university application, etc.) and informing resource allocation (e.g. school funds)
- Great potential for linkages with data from other sectors

Estonia: Estonian Education Information System (EHIS)

Korea: National Education Information System (NEIS)
School improvement data systems

- Systems designed to support school improvement efforts by putting data in the hands of principals and teachers
- Key features include customisable school reports and visualisation tools such as dashboards
- Enable new « improvement routines » (data teams, enquiry teams, etc.) and digital communities of practice
- Try to provide information at the individual level and with a granularity that makes data more relevant to teachers

England: Analyse School Performance (ASP) system (formerly RAISEonline)

Portugal: Escola 360° (E-360°)
Expert data systems

- Aim to help personalise teaching and learning and to provide real-time feedback to teachers, students and principals
- Combine administrative data with process and formative assessment data from learning management systems
- Learning analytics and other diagnosis techniques
- Allow adjustments in ongoing instruction cycles – vs. end-of-year feedback
- Advanced features: links to banks of educational resources, recommendations and networking platforms for teachers

Colorado (US) state-wide longitudinal system and SchoolView website

New developments in New Zealand and Denmark (?)
Colorado state-wide longitudinal system and SchoolView website

Changing Conversations™ about school performance and educational resources across Colorado

**Colorado growth model**

**Compare** the performance of Colorado schools and districts and gauge their progress.

**School performance**

**Access** performance data for all schools and districts across the state.

**Learning center**

**Discover** SchoolView features and find resources related to Colorado's Statewide System of Accountability and Support.

**Community connections**

**Connect** with others about school improvement.
Colorado state-wide longitudinal system and SchoolView website
Colorado state-wide longitudinal system and SchoolView website
why a new generation systems are needed: 2 examples
Presumed enrolment patterns in US community colleges

Source: Crosta (2013)
Actual enrolment patterns in US community colleges

Source: Crosta (2013)
Preventing dropout through early warning systems

- Early warning systems can use longitudinal data points to identify students at risk of dropping out.

- Bowers and Trout identified different types of profiles requiring different types of interventions:
  - 38%: Jaded dropout: don’t like school, low and declining grades
  - 53%: Quiet dropout: like school, low and slowly rising grades
  - 9%: Involved dropout: like school, high grades, either a significant life event (such as pregnancy or family mobility) or unexpected need to take an additional course (eg mistake in their transcript)
Stephan.Vincent-Lancrin@oecd.org

THANK YOU / MERCI

https://oe.cd/educationceriinnovationstrategy
Project EMIS

Developing Modern Education Management Information Systems
UNESCO International Seminar 27 May 2021

Louise Macquet
EMIS Cloud Business Development Lead
Introduction, objectives and activities

Transforming Education with EMIS

What is project EMIS

Stakeholder Engagement for Success

Upcoming Workshops
Transforming Education with EMIS
Introduction:
Data Analytics in Education

- Improve competitive advantage
- Employing data for evidence-based education planning
- Understanding the status of education system
- Revolutionize education: National level policies into classroom practice
Enabler: EMIS

- Data Collection
- Data Management
- Data Utilization (Incl. analytics and reporting tools)
What is Project EMIS?
Overview
EMIS will support a community of leading education systems to develop modern data architectures for national and global education reporting and analytics.

Expected deliverables:
• Support to strengthen the capacity of education systems on modern EMIS, to produce high-quality and timely education and finance data
• Support the development of common data model for education, aligned to SDG4 indicators.
• EMIS pilot supported by partners to enable lower costs of national education data collection, management, while increasing national and global reporting.
• Case studies of pilot implementations using modern data architectures for national and global education reporting.

Field contact person:
Louise Macquet (v-lomacq)
Challenges to an effective EMIS

No policy framework guiding education data processes

Human resources development for education data

Lack of technology for data collection

Available data but without integration and value-added analysis

No standardized identification systems
Business applications development challenges

- **Budget constraints**
- **Developer resource constraints**
- **Business expectations**
- **Paper processes**
- **Complex processes**
- **IT/business partnership**
- **Legacy system maintenance**
- **“Shadow IT” governance**
- **Leverage existing technology**
- **Security & compliance**
The impact of accidental architecture

- Less Operationally Efficient
- Higher Cost
- Slower Time to Value
- Increased Difficulty in Governance
- Change Management challenges
What is Leading Countries of the World in modern EMIS?

Support to strengthen the capacity of leading education systems on modern EMIS, to produce high-quality and timely education and finance data to reach their specific targets and goals.

Data Policy: data standards, security, governance and ethics.

Data Platform: modern data architecture, engineering management and collection/transfer/ingestion tools.

Data Research: data access, reporting, visualizations and data science (statistics, AI, machine learning models).
EMIS Maturity Model

### Data metrics and country levels

<table>
<thead>
<tr>
<th></th>
<th>ENTRY</th>
<th>EMERGING</th>
<th>ADVANCED</th>
<th>TRANSFORMATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of data collected</td>
<td>Basic data</td>
<td>Comprehensive student data</td>
<td>Comprehensive student, staff, finance data</td>
<td>Holistic quantitative and qualitative student, staff, finance data, including IoT</td>
</tr>
<tr>
<td>Data collection cycle</td>
<td>1+ year</td>
<td>&lt; 1 year</td>
<td>Real-time human-entered</td>
<td>Real-time human-entered and telemetry</td>
</tr>
<tr>
<td>Policy guidance and reporting</td>
<td>Limited application of data to guide policy</td>
<td>More targeted reporting to guide policy</td>
<td>Data-driven policies and standards</td>
<td>Adaptive organisational culture informed by data</td>
</tr>
<tr>
<td>Application of data</td>
<td>Underdeveloped</td>
<td>More advanced application</td>
<td>Implementing advanced analytics</td>
<td>Applying cognitive services and AI</td>
</tr>
<tr>
<td>Technology/data standards</td>
<td>Basic technology, including analog; local or limited education data standard</td>
<td>Digital data storage; recognized education data standard partially applied</td>
<td>Cloud-based data storage; alignment to recognized education data standard</td>
<td>Networked intelligent cloud storage; integration of multiple or extended education data standards</td>
</tr>
<tr>
<td>Data privacy and security</td>
<td>None</td>
<td>Limited privacy framework</td>
<td>Comprehensive privacy</td>
<td>Privacy balanced with transparency</td>
</tr>
</tbody>
</table>
Value to Education Systems

**Data Completeness:** Data for all data elements for all recording entities.

**Data Relevance:** Collecting relevant data for meaningful use in education decisions.

**Data Accuracy:** Accurate data capturing methods, validation methods and data verification processes.

**Data Timeliness:** Accurate Real-time data for current and up to data access.

**Data Accessibility:** Accessible data to all levels of the education system.
Stakeholder Engagement for Success
Donors and Development Partners
education management information systems (EMIS) lies at the very heart of efforts to monitor progress towards the world’s education goals, particularly Sustainable Development Goal 4 (SDG 4).

Silvia Montoya, Director of UNESCO Institute of Statistics (UIS)
April 2018
Data collection related to Sustainable Development Goal 4 (SDG4) indicators

Aggregate and curate data with EMIS

Proposed set of standards
EMIS Architecture

Buyer’s Guide
- Key Components of EMIS
- How the SDG 4 indicators have changed the scope of EMIS
- EMIS functionality and standards

User’s Guide
- EMIS Production Lifecycle

Education Management Information Systems

Efficiency and Effectiveness in Choosing and Using an EMIS

Guidelines for Data Management and Functionality in Education Management Information Systems (EMIS)

Chris van Wyk and Luis Crouch
EMIS Solution Partners
EDUCATION4SIGHT has partnered with multiple organizations in EU to contribute to the modernization of the educational and training system towards the adoption of new cloud-based teaching methodologies and services for the acquisition of digital competences in primary and secondary schools in Europe.

The CRiSS innovation project was setup to develop pilots with more than 490 schools, covering 25,400 students and 2290 teachers around Europe.
**FIRKIDJA DI SKOLA** is a pilot project created in 2012 by the government of the Guinea-Bissau, region of Gabú, and by the Fundação Fé e Cooperação (FEC), whose goal is to collect and organize data from the schools of the Gabu Region.

This project connects technicians, working everyday the ground, with the schools and management institution, registering varied information on the Skola platform, like pedagogical information, infrastructures and human resources of the school. This is an essential task to act quicker upon situations of school abandonment and for help decision-making within the scope of local educational policies.

FIRKIDJA di Skola was built on the **esKola** platform, that is an integrated system of Educational Data management and information, developed entirely on Microsoft technologies and available since 2019 t on Microsoft Azure, providing additional security, availability and performance to meet the regulatory requirements.

...when we say Firkidja di Skola we are talking about a pillar that holds the school and no country can move forward without having a reasonable statistic, an available statistic (...). While this is not available the country does not advance, The project manager took me to a computer and said to me: Mr. Governor, look for any school in one of these sectors you know, a school there in Pitche, and with two clicks the school was in front of me, the building, the students, the teachers...

When we (EU) supported this project, we devised that it had to begin with the foundations, with the basis of, an Education Politic in Guinea-Bissau. To work on these bases it must start by compiling information, knowing how many students and how many schools exists and which resources exist. We want to be very conscious of the developments of this project and the geographic expansion inside the country.

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**Patrick Daniel**  
Regional Governor of Gabu, Guinea-Bissau
For a large school group with **220+ schools in 10+ countries** in Asia, Middle East and Africa, offering National, British and IB curricula, nexquare’s multi-tenant K12 Education Management Solution is providing the unique ability to have a single, standardized platform operating across all their network. It provides near real-time visibility and insight into student learning, teacher efficacy and school operations; hence, enabling evidence-based decision making at the **head office in Paris**.

For schools located in remote areas with poor to no internet and electric connectivity, offline application will be piloted to enable the teachers and school leaders, digitize operations and increase transparency.

“We see nexquare as an integral partner to assess and provide insight into the intricacies of interventions at various points of that student’s life.”

**Chief Technology Officer**, Large School Group
CASE STUDY: Selection, Supply and Implementation of the Edupac Educational Management System as the Preferred Educational Information, Administration and Management System for All Educational Institutions in Namibia - 2010

Customer Challenges:
- No standardized EMIS electronic system – school data is paper based via forms.
- Data collection difficult due to distance and geographical challenges.
- Dependency on Courier and Postal Services for communication between the MoE and Schools, no secure e-communication.

The Aim of the Project:
- To enable schools to be able to manage all school related processes electronically;
- To be able to have real-time centralized national data available from all schools at any given time.

The Microsoft SQL development and customization concluded over a period of 3 years followed by a training and support phase for 4 years.

The Training and Support Phase included the upskilling of MoE resources to promote future self-sustainability and bridge culture gaps. Training materials were provided in Word, Excel and PowerPoint. It was a win-win and affordable solution.

Wins and Results

School Management Teams now have real time information available at any time and more control over the day to day management in schools.
Daily Monitoring of Learning outcomes and performance is a reality.

Regional Management Teams and Inspectors have ongoing insights into what is happening at the schools in their respective regions without having to physically visit schools.

Availability of real-time Administrative, Curriculum and Financial data enables all Management levels of the Educational Departments to analyze information and to make informed proactive decisions.
K-12 Education Accelerator & Data Tools
**Education Accelerators**

Accelerators expedite development of vertical solutions utilizing industry tailored data models based on top industry standards with business logic integration that can leverage data across Azure, D365 & M365.

<table>
<thead>
<tr>
<th>Capabilities</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry CDM Schemas built on industry standards</td>
<td>Accelerate partner &amp; customer app dev</td>
</tr>
<tr>
<td>Workflows &amp; business processes</td>
<td>Open-source offerings enhanced by dev community</td>
</tr>
<tr>
<td>Samples &amp; Templates</td>
<td>Decreased development costs &amp; faster time to market</td>
</tr>
<tr>
<td>Industry Connected Scenarios</td>
<td>Enable true connected experience in industry</td>
</tr>
<tr>
<td>Sample data, pre-built ML models, AI integration &amp; automation*</td>
<td>Easily build solutions leveraging multiple CDMs</td>
</tr>
</tbody>
</table>

*Initial Accelerator launch may not include all of these capabilities.
Github: Industry Accelerator Education

Open-source creative license available on Github

- Data model
- Standard entity attribute extensions
- Pre-build dashboards and portals
- Sample Data
- Development Tools
Data Collection, Management & Reporting Tools

Data Collection

Many Data Sources

Azure Data Factory for Data Ingestion

Data Lake Storage

Common Data Model for Edu

Create new metrics

Statistical Research, AI and Machine Learning

Data Visualizations

Internal and External Data

Structured and Unstructured Data

Create new metrics
Upcoming Workshops
EMIS Journey & Timeline

IDENTIFY

Timeline:
• June 2021

Stakeholders:
• Senior Leadership Teams

Actions:
• EMIS Maturity Stage
• Understand your strategic priorities and challenges
• Envision priority education scenarios that align to your overall strategy

Deliverables:
• High level Vision Document
• Establish EMIS Policy and Management Committee (EPMC)
  • Responsible for managing implementation of EMIS Action plan

EXPLORE

Timeline:
• June 2021

Stakeholders:
• EPMC

Actions:
• Potential Partnership Options
  • Partner Introductions and demos (Open Source / Off the Shelf Solutions)
  • Microsoft Education Accelerator and data tools (Custom Design)
• Capacity Building
  • Microsoft Resources for Learning

Deliverables:
• Project schedule and approach

DESIGN

Timeline:
• June 2021

Stakeholders:
• EPMC

Actions:
• Define current state – people, process, technology, compliance and security
  • Technical Requirement Overview
  • Tech Functionality Requirements
  • Services
  • System Performance Requirements
  • Project Delivery
  • Skills Transfer and Training

Deliverables:
• Business case for prototype / pilot implementation framework
Thank You