The African Digital School Initiative: STEM, ICTs and the Teaching Profession

Presented by: Mary Hooker
Senior Education Specialist, GESCI

mary.hooker@gesci.org
Overview

• Part 1: STEM and the Teaching Profession
• Part 2: How ADSI contributes to STEM TPD
• Part 3: Main lessons
PART 1: STEM AND THE TEACHING PROFESSION

Some Good and Sobering News
Global Monitoring Reports 2012 - 2015

• Significant **progress** in EFA goals.

• **34 million children** attended school as a result of faster progress since Dakar

• Greatest progress achieved in **gender parity**, particularly in primary education

• Governments increased efforts to **measure learning outcomes** through national and international assessments

• ‘**Silently excluded**’: many young people leave schools lacking foundational skills
WHERE STUDENTS PERFORM WELL

Science – ‘Factual Knowledge’
Mathematics – ‘Facts & Procedures’

Closing Equity Gap - Learning MS Basics

Performance gaps?
Conceptual & Transformative Skills
• ‘Understanding & using concepts’
• ‘Solving routine & complex problems’
• ‘Reasoning and analysis’
MSE Contribution to SDGs 4 & 8

Transferable Skills for Life Long Learning

Skills for Work & Inclusive, Sustainable Economic Growth

Access to Quality Instruction in M&S

Interpreting, Analyzing, Manipulating Information or Data for SD

Solution?
New Conceptualization of Teacher Education
  - Experience in 21CTL
  - Problem Solving
  - ICT-STEM-Skills
PART 2: THE AFRICAN DIGITAL SCHOOL INITIATIVE (ADSI)
A model for strengthening innovative practice in Science, Technology, English and Mathematics (STEM)
Leveling the playing field...

The ADSI Model

Digital School of Distinction Framework

ICT Competency Framework for Teachers

21 Century Skills-STEM Framework

SIPSE Pilot 2013-2015; 20 Schools; 20 School Heads; 120 Teachers; 5,000 Students
The African Digital Schools Initiative: 2016-2020

Phased Approach: 140 schools, 140 school heads; 1,400 STEM teachers, 70,000 students.
Supporting Innovative Practice in STEM with and through ICT

Blended Learning Resources

- E-learning, m-learning & teacher portal platforms/OERs/Exemplary ICT-STEM materials
- Tutor support online and school based coordinators
- Teacher Technology, Pedagogy & Content Knowledge (TPACK-in-practice)

Current Practice
Exploring ICT use to support didactic teaching

Active Teaching & Learning
Whole class dialogue
Questioning techniques
Collaborative group work

Peer-to-peer Learning
Teacher try outs
observation
Reflective practice
Self-assessment

New Pedagogy
Problem & project based learning
ICT use to build
STEM concept understanding & use

Teacher Design Teams
Multi-disciplinary community of practice
TEACHER Design Teams
To tackle ‘wicked problem’ of ICT integration

**Build teachers’ 21CT capacity**

for problem solving and collaborative professional learning

to **challenge existing tacit knowledge**

about STEM T&L

to design new ‘frames’ for innovative use of ICT in STEM/ 21CL

Reflection on current practice challenges/problems

Re-design ideas for improving practice

Design & try out ideas for ICT use in STEM

Peer-to-peer lesson observation & reflection

Develop lesson plans for ICT in STEM

Koehler & Mishra (2008); Koh, Chai, Wong & Hong, 2015
Leadership and Planning

ICT in the STEM Curriculum

E-Learning Culture

Professional Development

Infrastructure & resources

Build schools’ 21CL capacity for e-learning strategies and planning to challenge existing tacit practice about ICT in T&L to design, monitor and evaluate enabling environments for integrating ICT in STEM

SCHOOLS As Learning Organization

GESCI Digital Schools of Distinction,
PART 3: MAIN LESSONS

Innovation to institutionalization... knowledge management... change as complex... research co-design...
PARDIGM SHIFT
From ‘pilots’ to ‘institutionalization’

Strengthening Innovative Practice in Secondary Education (SIPSE) Pilot Learning... 2013-2015
## REFORM & INNOVATION

**Knowledge flow - ‘multiple conversations’ – vision and action planning**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Members</th>
<th>Role</th>
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</thead>
<tbody>
<tr>
<td><strong>National Planning Partners Expert Working Groups</strong></td>
<td>Ministries &amp; Departments, Universities, TEIs, TVEs, Schools, Subject experts, TSCs, etc.</td>
<td>Prioritization curriculum mapping, module development…</td>
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<td><strong>Project coordinator regional, district &amp; county support teams</strong></td>
<td>Champions, subject technical support district / county directorates</td>
<td>Online facilitation; school visits programme</td>
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<td><strong>School level 1: Management</strong></td>
<td>Heads, BoMs, PTAs, Community</td>
<td>School Strategy and Planning; DSDF</td>
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<td><strong>School level 2: School based support teams</strong></td>
<td>School based coordinators</td>
<td>School based support – focus on practice &amp; reflection;</td>
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<td><strong>School level 3: Teacher Design teams</strong></td>
<td>STEM and other subject teachers</td>
<td>Lesson planning &amp; resources; peer-to-peer observations; workshops - Video – individual &amp; collective review ICT-ATL</td>
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<td><strong>Strategic partnerships</strong></td>
<td>UNESCO, ADEA, AUC, MS, INTEL, Ministerial Forums,</td>
<td>Sharing of lessons learned; informing policy and strategy on emerging good practice</td>
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Hannay, Ben Jaafar and Earl, 2013
Develop rigorous frameworks for measuring ICT impact on STEM 21CL & Skills

involve full value chain of researchers-practitioners-policy makers

learning & utilization driven policy making

from national to school levels

RESEARCH, POLICY & PRACTICE TRIAD

Butler, Leahy, Shiels & Cosgrove, 2013
Thank You
References


• Digital Schools of Distinction (2014) at: http://www.digitalschools.ie


