Global Best Practices
Creating a pipeline for STEM @ AIMS

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MS4SSA Conference: May 15-16, 2017,
Worcester Polytechnic Institute, USA
The Opportunity: Africa’s untapped talent

By 2050 40% of youth will be African.
The Challenge
Mathematical & Scientific skills - backbone of modern societies

① Less than 25% of African students go into STEM fields at tertiary level.

② No African government spends more than 1% of GDP on research and development.

③ Africa produces less than 1% of global research output.

④ African governments are obliged to outsource STEM related services to expatriates.
The AIMS Ecosystem

Africa's Youth: the world's greatest untapped pool of scientific and technical talent.
Why Teacher Training for AIMS?
The LEAKY pipeline.....

- Formative
- Multiple interventions
- Improving access and Quality

EARLY CHILDHOOD & PRE SCHOOL

- Education for all
- Access
- Improving quality
- Transition rates

PRIMARY LEVEL

- Leaky pipeline begins
- Male / female issues
- Completing critical to transition
- Level at which many get into the workforce
- Limited linkage between subject and applications in real life

SECONDARY

- Reduced transition
- Fewer females
- Limited understanding of career paths in STEM
- Limited soft & employability skills (AIMS Co-op program)

TERTIARY

- Fewer opportunities for women (AIMSWIS)
- Graduates not job ready (AIMS Industry Intuitive)
- Industry R&D needs
- Industry input in AIMS curriculum
- Africa continues to outsource high end skills
- Deficit in high end capacity for knowledge based economies in Africa

STEM CAREERS
HOW AIMS is doing it....
AIMS Teacher Training Initiatives

Inspiring lifelong learning to tackle real world problems

AIMS-Schools Enrichment Centre (AIMS-SEC)- SOUTH AFRICA

- Teacher professional development program, in partnership with the SA government for teachers in rural and township communities
- More than 1500 teachers have completed the 3-month Mathematical Thinking course
- Over 200 teachers, subject advisers and field trainers graduated from the 2-year Advanced Certificate in Education (ACE)

Awarded UNESCO-Hamdan Bin Rashid Al-Maktoum Prize for Outstanding Practice and Performance in Enhancing the Effectiveness
Reaching Students Through Their Teachers

[Diagram showing Teacher Training Program and statistics]

- **1920** In-service math teachers
- **1200** Pre-service math teachers
- **50** Trainers of trainers

Total: **1.7 million** Secondary school students reached
Additional Teacher Training Initiatives

1. The Teacher Training Program, AIMS Cameroon

2. The Teacher Training Learning Initiative, AIMS Rwanda

3. The Teacher Training Program, Ghana

4. The Teacher Training Program, Tanzania
Overview of the AIMS Teacher Training Framework

- Improved quality in Mathematics Education
  - Mathematics Teacher Training
  - Gender equality and Inclusion
  - Community of practice
  - Relations with Government
  - Public engagement and outreach
A Results Based Teacher Training Framework

Touch the children through their teachers

To enrich the pipeline
AIMS Teacher Training Program – Features

1. Results Based
2. Gender responsive pedagogy
3. Institutionalized – Schools, Ministry of Education and affiliated agencies, local structures.
4. Decentralized
5. Blended learning
6. Continuous Professional Development.
AIMS Teacher Training Program – Lessons learned

① Capacity development should be matched with Behavior Change Communication for optimal results.

② Access to learning must be continuous (CPD, tools, peer learning, updated resources).

① Adaptation and adoption of non conventional solutions to meet context challenges (like of computers in some areas, non monetary incentives, mentorship).
Recommendations

1. Pilot MS4SSA in Rwanda based on AIMS experience and the GoR enabling environment.

2. The initiative should be adaptable to both highly and low resource schools.

3. Use of home grown, locally available, contextual related solutions where ICT infrastructure.

4. Behavior Change Communication is crucial for successful teacher training.

5. MS4SSA should augment the curriculum, not be a stand alone initiative.
Q & A
Thank you!
AIMS approach to Curriculum Design

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AIMS Methodology

1. TTIs augment and overlay the national curriculum.

2. Stakeholder consultation to have evidence based information on the gaps in the design, implementation and assessment of the curriculum.

3. Design, implementation and measurement is based on the relevance of learning outcomes.

1. Interactive subject pedagogy
AIMS Methodology

5. School based, peer facilitated: Plan - Teach - Reflect.

6. Is based on school structures.

7. Is broken down into an arsenal of practical resources that teachers can easily refer to in the delivery of lessons (teachers guide, teacher’s resource guide etc).

8. Community of practice resources to promote peer learning.

9. Includes the creation of an enabling environment.

10. A gender lens.
Teaching teachers to engage the learners with practical resources
Engaging with a learner-centred activity
Q & A
Thank you!
## Teaching & Learning
### What is Changing?

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<th>What AIMS is working on</th>
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<td>Uniform Learning (Mass Production)</td>
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<td>Sources of Knowledge</td>
<td>Customized Learning – Personalization</td>
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<td>How learners are assessed</td>
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<td>Diverse Knowledge Sources</td>
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<td>Curriculum objectives</td>
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<td>Reliance of outside sources</td>
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<td>How learners access knowledge</td>
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<td>Knowledge explosion – learning how to LEARN.</td>
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TECHNOLOGY IN MATHEMATICS  

**Aspirations...**

**e-Learning**
Learner-driven access to education content

**Interactive Distance Learning**
Tutor driven delivery of education content over long distances
- Rwanda SMART Classrooms
- Cameroon Simulation labs
- South Africa

**Mobile Learning**
Lean education content without the need for classrooms

AIMS seeks to partner with GESCI (http://gesci.org/)

**e-Collaboration**
Learning together by working together across distances