

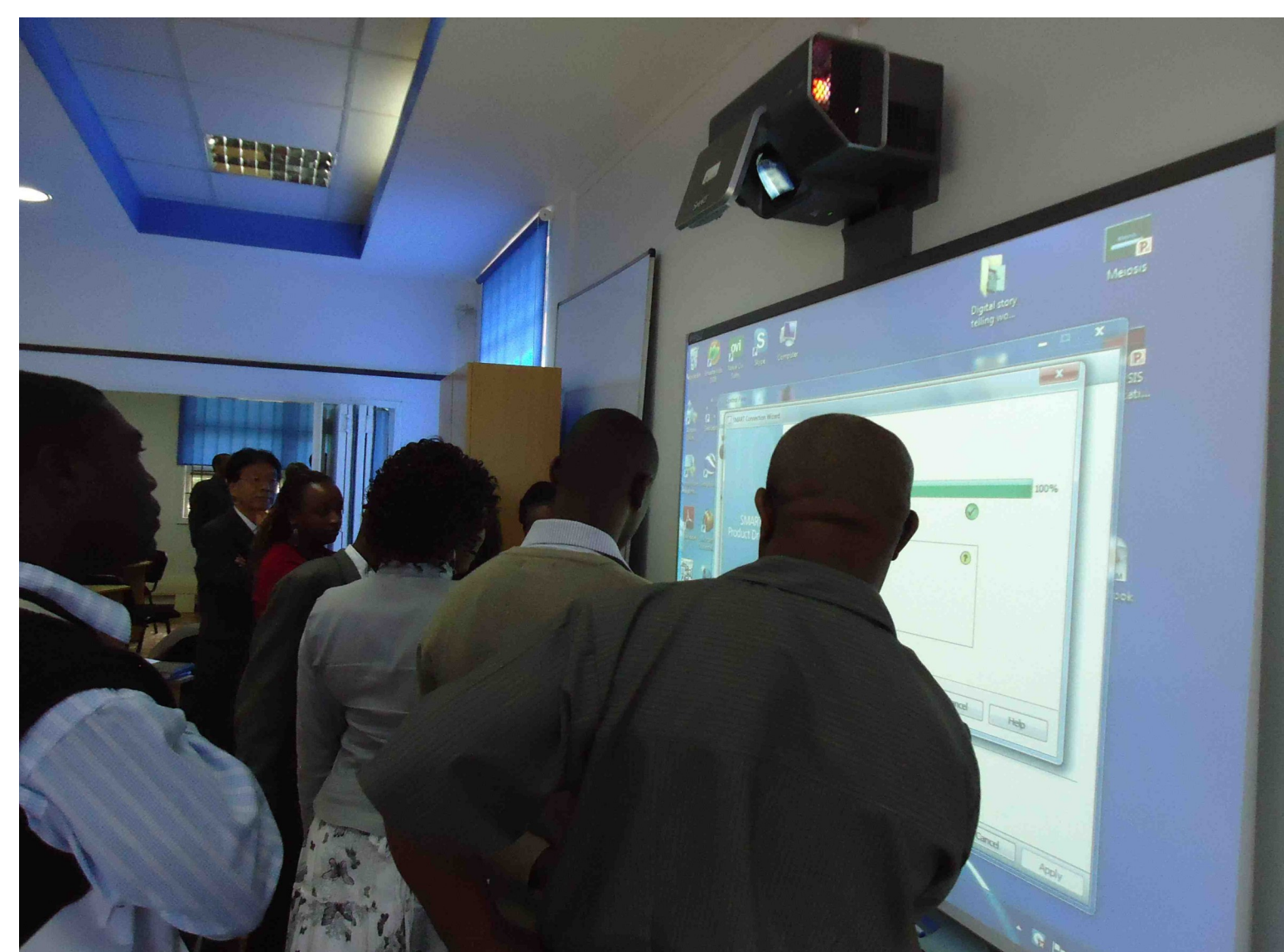


HP Catalyst Initiative

# Using Technology to Support Conceptual STEM Teaching and Learning

Kenyatta University

<http://ku.ac.ke>



Teachers examining a SMART Board

## Project Objectives

Our objectives are to:

- support mathematics and science teachers in Kenya in integrating technology as a teaching and learning tool into their classrooms,
- support mathematics and science teachers in Kenya in developing deep and connected content and pedagogical content knowledge, and
- build connections in Kenya between pre-service teachers' preparation and teachers' work in schools allowing for coordinated monitoring of unpacking of STEM content for learners.

Implementation takes place at three levels: STEM content and pre-service teacher level at university, and in-service teacher level.

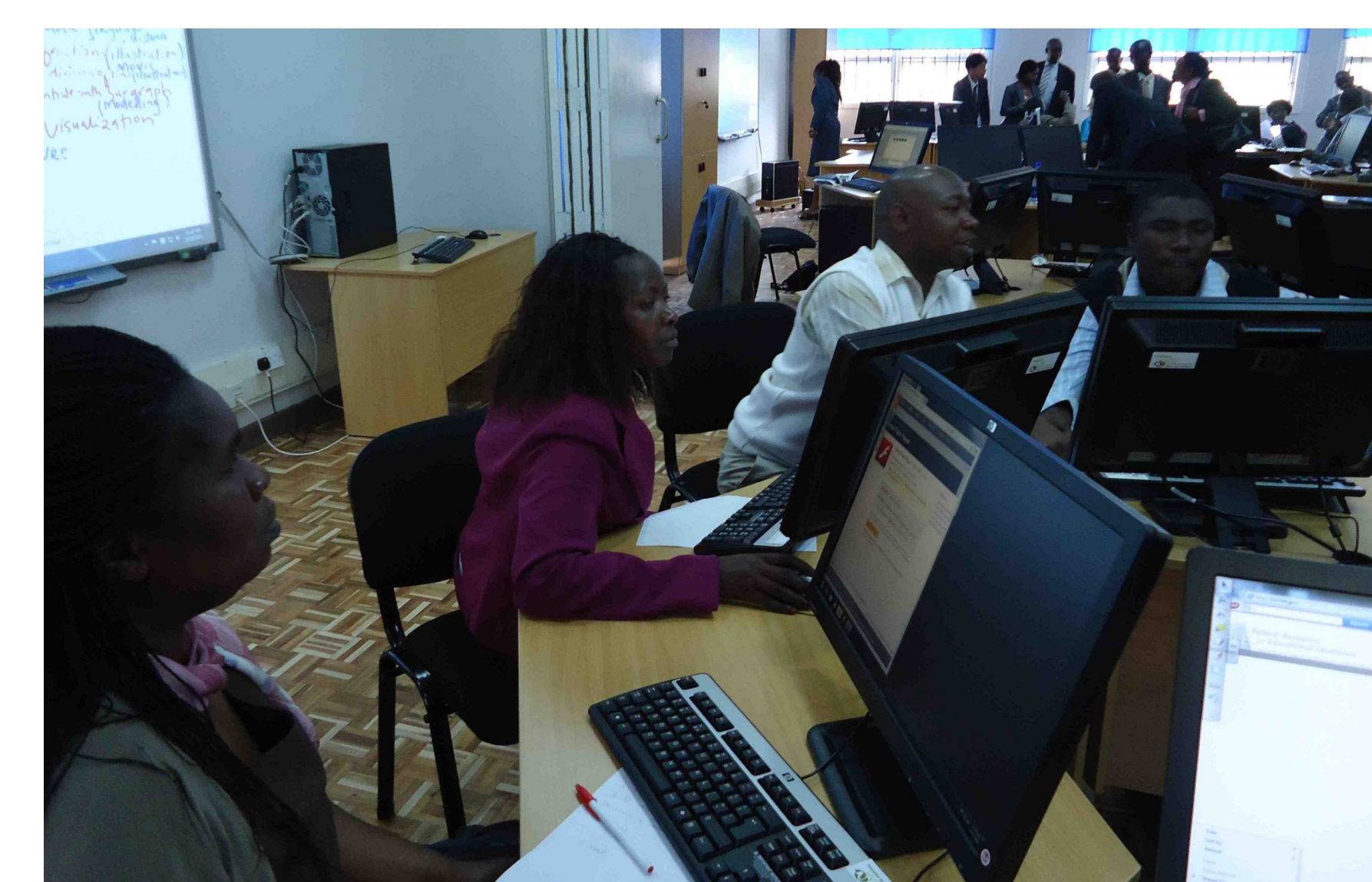
## Present and Future Work

Through the HP Catalyst Initiative, we are working with more than 300 pre-service mathematics and science teachers, as well as approximately eight in-service mathematics and science teachers at two nearby high schools, through a series of workshops to teach them how to use computer technology in their instructional planning and how to integrate HP MCL Science Probe Kits and HP Graphing Calculators technology into their teaching. During the two years of the project, these teachers will use technology-rich tasks with approximately 960 secondary students.

With our additional funding through the HP Catalyst Leadership Fund, we will scale-up our efforts to working with more schools and partner with two other universities. We intend to introduce new technologies and additional instructional strategies as we support pre-service and in-service teachers in integrating technology into their teaching practice.



Workshop with in-service teachers



Technology workshop with in-service teachers

## Background

Kenyatta University was awarded a grant from the HP Catalyst Initiative

(<http://www8.hp.com/us/en/hp-information/social-innovation/catalyst.html>).

Working through the HP Catalyst Initiative consortium pedagogy 3.0, the mathematics and science educators from the Department of Educational Communication and Technology at Kenyatta University are collaborating with:

- colleagues from the Departments of Biology, Chemistry, Mathematics and Physics at Kenyatta University,
- mathematics and science education colleagues from Syracuse University, California State University-Fullerton, and California State University-San Marcos, and
- the National ICT Innovation and Integration Center (NI3C), Ministry of Education in Kenya.

HP Lead Team members during a planning meeting



Workshop with pre-service teachers



## Capacity-building Activities

### Planning

- Project team meetings to (a) recruit in-service teachers, (b) recruit pre-service teachers, (c) prepare for workshops, (d) prepare for classroom observations.
- Workshops with Kenyatta University faculty members from STEM department to introduce HP equipment and familiarize them with how this equipment can be used in their content courses.
- Workshops with STEM in-service teachers from two high schools (1 girls' school, 1 boys' school) to introduce technology and integration strategies in their lessons.
- Workshops with STEM pre-service teachers to introduce technology and support them in exploring, planning for and using technology during their teaching practice.

### Implementing

- Support in-service and pre-service teachers in integrating technology into their teaching practice.

### Monitoring

- Observe in-service and pre-service teachers using technology in their teaching.
- Provide support and constructive feedback.
- Gain teachers' perspectives on their use of technology.
- Disseminate our experiences and knowledge gained.

## Outcomes

- We now have a department computer lab, graphing calculators and probe kits to use with pre-service and in-service teachers.
- We have worked closely with 8 in-service teachers and their colleagues, for a total of 32.
- We have worked with 300 pre-service mathematics and science teachers on integrating technology into their teaching practice.
- Through this work, we have reached more than 3,000 secondary students.
- Four mathematics and science education faculty members have developed strong capacity in technology integration and they have supported other members of their department and graduate students in building capacity in this area.
- Six faculty members from STEM departments have built capacity in technology integration.
- We have built a strong collaboration with the National ICT Innovation and Integration Centre (NI3C).
- We have received a Leadership Fund award and will be extending our work through collaborations with NI3C, Masinde Muliro University of Science and Technology, and the University of Bristol.

## Contacts & More Information

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Dr. Nicholas Twoli — Chemistry Education

### Websites

[http://soeweb.syr.edu/centers\\_institutes/Kenya\\_partnership\\_projects/hpinitiative.aspx](http://soeweb.syr.edu/centers_institutes/Kenya_partnership_projects/hpinitiative.aspx)  
<http://cuseinkenya.syr.edu/>