

OpenSTEM Africa: creating onscreen tools to teach practical science at scale

Kerry Murphy, Maria Velasco & Sarah Davies, The STEM Faculty, The Open University, Milton Keynes, MK7 6AA, UK.



Introduction: Improving access to STEM education is viewed globally as a route to economic empowerment. OpenSTEM Africa is a collaboration between The Open University and government partners in Ghana to co-create virtual instruments, onscreen immersive laboratory experiences and virtual worlds to support the teaching and learning of the practical sciences.



Figure 1 *Left:* Biology teachers share their thoughts on how a virtual microscope will enhance access to learning. *Right:* The twelve curriculum areas where practical teaching could be enhanced by the use of onscreen applications.

Enhancing the curriculum: In 2019 workshops were held in Ghana with Senior High School science (SHS) teachers to identify areas of the science curriculum that could be supported by onscreen tools. Twelve curriculum areas were identified across chemistry, biology and physics that could benefit from the use of onscreen interactive applications and, importantly underpin learning linked to subjects regularly assessed in science examinations (Figure 1).

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kerry.murphy@open.ac.uk



Figure 2 *Left:* Physics teachers start the process of storyboarding interactive screen experiments. *Right:* An early draft for the spring mass system

Co-creation: A core principle of OpenSTEM Africa is that materials are co-created, ensuring their authenticity and relevance. Teams worked on storyboarding the practical science applications (Figure 2) and drafting exemplar lessons, CPD and Leadership materials to support the introduction and use of technology enhanced learning in Senior High Schools (Figure 3).

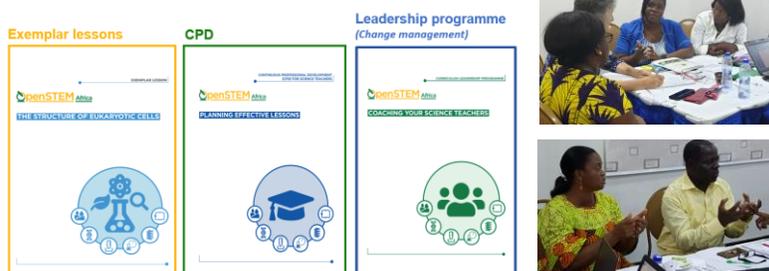


Figure 3 Front pages of some of the support materials created to enable a smooth transition to new ways of teaching and learning.

The OpenSTEM Africa Virtual Laboratory: During the pandemic the project teams worked remotely to translate storyboards into onscreen applications, creating the virtual laboratory. Another core principle of the project is that all of the materials created are Open Educational Resources. Figure 4 shows screenshots of the homepages for some of these applications. Short videos demonstrating how each is used can be viewed via the OpenSTEM Africa YouTube channel.

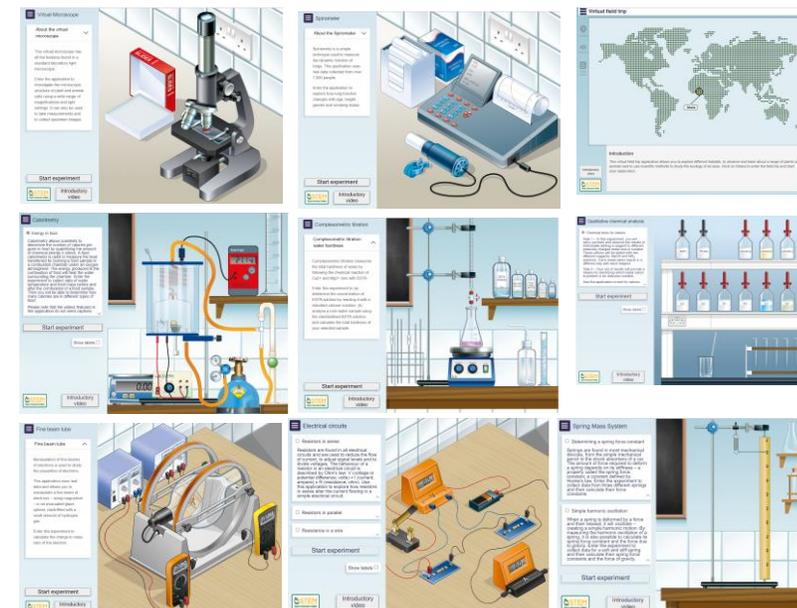


Figure 4 Introducing some of the applications in the virtual laboratory. The Virtual field trip was produced in partnership with the University of Ghana. The virtual laboratory and materials can be accessed using the link at the bottom of this poster:

<https://www.open.edu/openlearncreate/course/view.php?id=5612>