

Bringing fun science to the Nigerian classroom

M. B. Maina^{1&2}, M. S. Muhammad², & Mohammed Buba³

1. School of Life Sciences, University of Sussex, Falmer, BN1 9QG, UK
2. College of Medical Sciences, Gombe State University, Nigeria
3. College of Medical Sciences, University of Maiduguri, Nigeria

Science capacity building is essential for effective long-term international development. However, in Africa cultural and religious misconceptions about science strongly hamper science development on the continent. In Nigeria for instance – Africa’s most populous nation - science literacy has been estimated as below 10%. In most schools, science teaching is too often based on outdated models that are long known to be ineffective. Moreover, science teachers rarely employ innovative teaching approaches, and consequently many students never develop a passion for science. These collectively contribute to low enrolment in sciences and the generation of poorly qualified teachers and scientists.

To begin to tackle these problems; with support from the Biochemical Society, we organised a series of interactive, hands-on outreach activities from April to September 2015, targeting primary and secondary schools. In the primary schools, students were told science stories on cells and system biology, shown normal and diseased cells under the microscope and explained common reasons of why the cells turn abnormal in diseases (Fig. 1). In the secondary schools, students received lectures on microscopy and were trained how to couple Foldscope and use it to visualise microorganisms in different water samples. These activities were to increase student’s interest in science and stimulate their curiosity in molecular sciences. Indeed, the activities stimulated many thought-provoking questions from the students that only future scientific discoveries could answer. For example, a primary school student asked why we could not find life on other planets, and another student asked how evolution could have modelled our biology into what we are today.



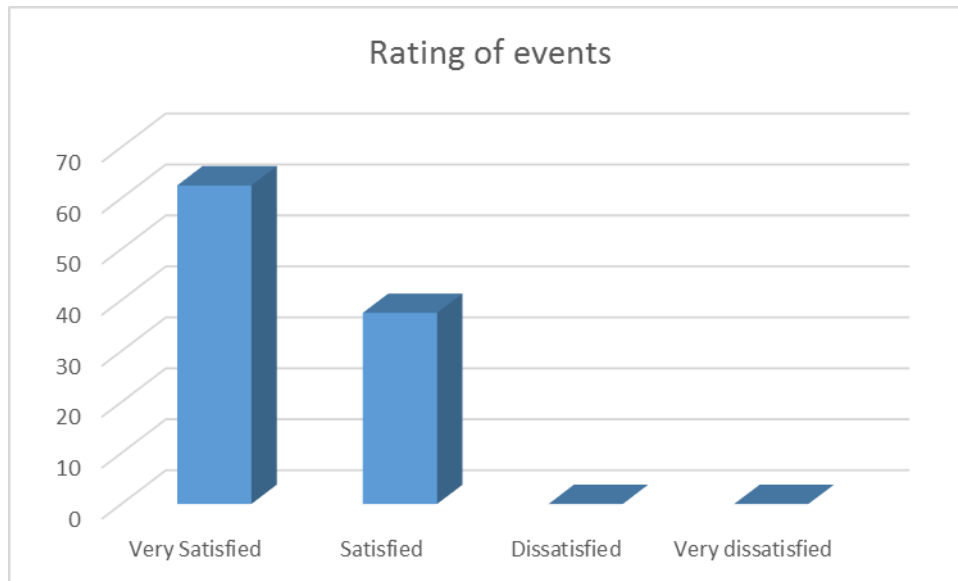
Primary school student observing cells under the light microscope.

We also run a separate event for science teachers to reinvigorate their passion for science, thereby help in creating a sustainable system where students would continue to get excited by their teachers about science. To this end, at least two (2) science teachers were invited from nine (9) primary and secondary schools to participate in a hands-on science workshop on running simple and enjoyable experiments for a low-cost setting that can be adopted to the classroom. They received training on creating density columns using salt or sugar solutions; rainbow reaction tubes by manipulating the acid-base balance of a solution; and preparing and viewing microscope slides using cheek smear or blood cells. The teachers replicated these experiments and were made to engage in brainstorming sessions on how manipulating parameters could change the experimental results (Fig. 2). In the end, reagent leftovers and manuals for running other simple and enjoyable experiments were donated to the teachers. They also received leaflets, pens and other freebies on neurosciences and molecular sciences.



Science teachers in different groups running experiments

To ascertain the impact of these activities, we administered questionnaires to the participants and also observed their enthusiasm during the hand-ons activities. We noticed a general increase in the knowledge of primary and secondary school students and teachers on the subjects discussed. All the teachers confessed that the outreach introduced them to simple approaches of designing simple science experiments that they now intend to use in connecting theoretical teaching with practicals in their classroom. For instance, a teacher said, “learning how to prepare and view microscope slides was the most important part of the workshop for me, I will introduce it to my students”. The students and teachers showed increased interest in science and desire to pursue teaching and/or research careers in molecular biosciences. The feedbacks from the events were overall extremely positive (Fig. 3).



Rating of event showed 100% satisfaction

Generally, the events demonstrated to students and teachers that science is fun and that scientists are approachable; not boring and complicated that the society thinks they are. The many messages of appreciation we received from the schools that participated in the events were exciting and confirmed that the activities were helpful. The event was covered by local media and thus we are hopeful that its success would increase the awareness and perception of science by the public, increase students passion for science, motivate similar activities by local scientists and encourage the government to consider regular curricular review to accommodate cutting-edge classroom science methods. Follow up on the participants showed that already, our activities have catalysed the interest of many students in science and consolidated the interest of those passionate about science.