

PARTNERSHIPS FOR ENHANCED ENGAGEMENT IN RESEARCH (PEER)

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PARTNERSHIPS FOR ENHANCED ENGAGEMENT IN RESEARCH (PEER) SCIENCE

Cycle 3 (2014 Deadline)

Mwangaza project on science, technology, engineering, and mathematics and computing education for students in Kenya with vision loss

PI: Jane Mwai (mwaiwang@gmail.com) with co-PI Mary Runo, Kenyatta University
U.S. Partner: Bruce N. Walker, Georgia Institute of Technology
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Every day we are bombarded with numbers and values, often presented via charts and graphs. We need to comprehend the data and make choices in our lives as a result. For people with vision loss, graphical presentations of data may be difficult or impossible to access. This makes education and employment especially difficult in STEM fields, and it makes the dream of attending university very distant for students who are blind. For more than ten years, Prof. Bruce Walker's Sonification Lab at Georgia Tech has been grappling with how to make data, and thereby STEM, more accessible to blind students and workers. For many practical and scientific reasons, the main focus in this line of research has been the study of auditory graphs and the development of software tools to support the use of multimodal data displays in classrooms. Currently, Dr. Walker has a field study at the Georgia Academy for the Blind (GAB) in Macon, GA, in which Sonification Lab software, hardware, and methods are being deployed and studied in middle-school math classes. The Sonification Lab has been collaborating with the U.S./Kenyan non-profit organization inABLE to establish and equip computer labs at schools for the blind in Kenya and train teachers and students in computer skills so they can take full advantage of the technology. With support from this PEER grant, Kenyatta University faculty members Prof. Jane Wangari Mwai and Prof. Mary Runo are joining the team as local research partners to conduct focus groups, stakeholder meetings, baseline surveys, fieldwork and iterative evaluations. The partnership between GT, Kenyatta, and inABLE is a great opportunity to conduct wide-scale research with large numbers of participants (students), and also to have a dramatic impact on education by deploying computers, training, and STEM teaching tools (including our software) across an entire school system in a developing country. Additional partners include Safaricom, Microsoft, and Uwezo, among others.

In Kenya, the GT+inABLE+Kenyatta collaboration to enhance STEM education for blind students has grown into the Mwangaza Project (mwangaza means "light" in Kiswahili), with participation from schools, universities, government, and companies. The project will enhance the education of the target students, but will also lead to better employment prospects for these students, as well, since they will now have computing skills and an education that includes math and science. The companies involved (e.g., Safaricom) see these students as a potential pool for hiring. This leads to a virtuous cycle, improving the lives of people with disabilities in rapid and dramatic fashion, as independence is enhanced in a sustainable way through training and employment. This project will also include collaboration with the Kenyan government. Once it has been demonstrated that computing and STEM topics can be taught to students with disabilities, the plan is to modify the educational curriculum to require such computing and STEM instruction. It is hoped that this will lead to additional resources to deliver on this requirement. Also, as the technology and STEM skills of students with partial vision loss are increased, those students may be mainstreamed into the regular public schools more successfully. The goal of mainstreaming is for blind students to learn alongside their sighted peers. However, until the implementation of this project, the methods and tools they need to learn and use graphs, especially for data interpretation in STEM subjects, have not been the same as (and not even equivalent to) those being used by sighted students. This project will begin to close the achievement gap between sighted and low-vision students.

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