

NARST LSEP REPORT

Development of Research Capacity in Malawi through Partnerships in Science Education

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A Report to NARST

Submitted by

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Introduction

This report will detail NARST's support to facilitate efforts to develop research capacity and partnerships between science educators in Malawi and South Africa. The specific initiative for which NARST support was provided is part of a larger research project exploring new ways of broadening the access of students into a more socially responsible science and technology education (Project SUSTAIN). The objectives of Project SUSTAIN are twofold: firstly, to encourage joint research amongst universities in sub-Saharan Africa (and through the NARST funding with a particular focus on Malawi) and universities in Norway on various aspects relating to how more students can be granted access into science and technology education; secondly, to explore new ways of making science and technology education more relevant, socially responsible, and welcoming to students with diverse backgrounds and interests. By building capacity among science educators / researchers, Project SUSTAIN aims to generate knowledge and research practice and methodologies that explore and promote the development of and access to a socially responsible science and technology education. For this initiative NARST provided 39% of the total costs (approx. \$3,400 of \$8,800) with the remaining expenses being covered by Project SUSTAIN, funded by NUFU (the Norwegian Programme for Development, Research and Education; <http://siu.no/en/Programme-overview/The-NUFU-programme>).

Project SUSTAIN builds on the notion that science education ought to be transformed in order to meet the needs of both our global and local societies (Kyle, 2006)¹. The project's particular focus is upon sub-Saharan Africa. Currently, science and technology education in several countries is more concerned with transferring canonical knowledge than with facilitating students' conceptualization and understanding of relevant scientific knowledge for the purpose of community development and social transformation. Science and technology education is thus perceived as irrelevant within most local communities, since it does not contribute to the knowledge necessary to transform and improve the local situation and address issues of sustainable development.

¹ Kyle, W. C., Jr. (2006). The road from Rio to Johannesburg: Where are the footpaths to / from science education? *International Journal of Science and Mathematics Education*, 4, 1-18.

Research topics explored within Project SUSTAIN are:

- What is sustainable science and technology education at a philosophical and / or conceptual level?
- How can science and technology education be transformed to become more:
 - Relevant and useful to students and communities when they make decisions about their lives, both within the context of a local and global society?
 - Empowering to all students regardless of their sex, race, and social background?
- What understanding of and attitudes towards science and technology as a social and material enterprise are students socialized into, and how do these presuppositions influence students' access to and capabilities for decision making and democratic participation?
- In what ways should science and technology education be linked intrinsically to broader societal issues, such as community development, poverty, un-and underdevelopment, climatic changes, health and nutrition, food production and issues of food scarcity, and HIV/AIDS?

The modalities of co-operation include:

- Joint research and development projects within and outside the region (sub-Sahara Africa);
- Exchange opportunities for scientists, specialists, and researchers in science, technology and environmental education;
- Exchanging / sharing information, resources, and documentation;
- Organizing joint scientific and technological conferences, symposia, workshops, exhibitions and courses of mutual interest to meet the needs of collaboration and partnership;
- Encouraging collaborative regional and international research partnerships on topics of relevance;
- Identifying new research partnerships for similar research programmes in areas of mutual concern;
- Engaging science and technology educators in multidisciplinary research endeavors.

Project SUSTAIN received its initial funding from NUFU in March 2007. Between April and September 2007 project staff developed programme materials and initiated the student application process for students from University of KwaZulu-Natal (South Africa), University of Pretoria (South Africa), University of Zambia (Zambia), and Chancellor College, University of Malawi (Malawi) to apply and be considered for admission into the programme. A condition of admission is that each student will attend the annual SAARMSTE conference in January and the Project SUSTAIN week-long research seminar scheduled for the week immediately following SAARMSTE for the duration of the programme (2008 through 2011). Regrettably, only 1 of 4 possible participants from Malawi arrived for the conference and workshop in January 2008. Unbeknownst to the Project Staff several other prospective students in Malawi applied for admission, were waiting to hear as to whether they had been admitted, and were able to travel to the conference / workshop venues. Unfortunately, their paperwork ended up in the wrong office and was not processed. This is a hardship that students encounter on a regular basis in sub-Sahara Africa; lost or missing paperwork (or other events such as university strikes, cancellation of programmes due to insufficient enrolment) can often lead to delays of 1 or more years in programmes of study or can even lead to students being ineligible to participate in programmes of interest to them.

Following the 2008 SAARMSTE conference and Project SUSTAIN workshop, the instructional staff agreed to review and admit additional qualified students from Malawi. Issues to be resolved were: How would

the students be able to acquire the experiences, skills and competencies missed in 2008 and be prepared to attend the 2009 required activities? And, how would these students be able to meet the NUFU requirements for the completion of graduate degrees within the specified timeframe?

The NARST LSEP offered an opportunity to expand the goals of Project SUSTAIN into a country-wide initiative in Malawi. The collaborative spirit of the NARST LSEP offered Project SUSTAIN the opportunity to foster research capacity building within a country that ranks 164th out of the 177 countries with data reported for the 2007/08 Human Development Index (HDI)².

A brief profile of Malawi (population 13.2 million) is as follows (data from UNDP, 2007):

- Life expectancy: 46.3
- Adult literacy rate (% aged 15 and older): Total population 64.1%; Females 54%
- Youth literacy rate: 71% (ratio of female rate to male rate: .86)
- Under-five mortality rate per 1,000 live births: 125
- Population undernourished: 35%
- Population using an improvised water source: 73%
- Population using improvised sanitation: 61%
- Population without electricity: 88%
- HIV prevalence: estimated between 14 – 21%
- TB cases per 100,000: 518
- Population living below the national poverty line: 65%
- Internet users per 1,000: 4

NARST LSEP Proposal

Busi Alant, University of KwaZulu-Natal, spearheaded the effort to submit a collaborative South Africa – Malawi initiative in response to the NARST LSEP call for proposals. Thus, the Project SUSTAIN instructional staff planned and proposed a very different approach to enabling the newly admitted students to receive the essence of the 2008 research programme. We proposed inviting education leaders from throughout Malawi to a workshop focused on the development of research capacity in science education and ways to transform the curriculum to be more relevant to the issues of the country and local communities. With such an orientation, the newly admitted students would be able to participate in a conference with other educational leaders from their country. Our hope was to foster partnerships and collaborations that would build upon and expand the ideals of Project SUSTAIN within the contextual reality of Malawi. And, since science educators at Chancellor College were collaborators to the NUFU-funded initiative, the NARST LSEP workshop would be oriented toward specific issues of need and concern as articulated by science educators in Malawi. The envisioned impact of the workshop would be at a personal level; ideally, the essence of the workshop would be sustained over time through the new collegial relationships established with an orientation toward social transformation.

² United Nations Development Programme (UNDP). (2007). *Human Development Report 2007/2008 – Fighting climate change: Human solidarity in a divided world*. New York: United Nations Development Programme.

Aims of the NARST LSEP – Project SUSTAIN Collaboration

Broadly, the aims of the NARST LSEP – Project SUSTAIN collaboration with Chancellor College, University of Malawi were to:

- Visit communities, schools and educational institutions for situated understanding of the contextual reality of the process of teaching and learning, as well as identify potential science education research contexts aligned with the goals of Project SUSTAIN
- Through the workshop, provide an overview of UKZN’s African Studies in Science Education module (developed by Bill Kyle and Olu Jegede in 1999 and continually updated as part of the UKZN graduate program in science education); and, introduce participants to the following:
 - A conceptual framework for sustainable science and technology education
 - Historical perspectives on the development and evolution of science and technology in Africa
 - Contextual issues impacting and impinging upon the development of science and technology (education) in Africa
 - The issues and challenges facing African science and technology education
 - Contextualizing research and research methodologies within Africa
 - The research process – from conceptualization to publication
- Provide education leaders in Malawi with an orientation to the goals of Project SUSTAIN
- Assist with the development of research proposals of newly admitted postgraduate students at Chancellor College so they are at a similar level of progress as the January 2008 Project SUSTAIN cohort
- Share experiences with lecturers from Chancellor College, University of Malawi to foster the continued development of an international network of science education researchers; seek ways to connect research agendas related to Project SUSTAIN

The proposed project is innovative in that it recognizes higher education institutions as major collaborators with communities engaged in grassroots efforts oriented toward community development and social transformation. The workshop will affect the nature of discourse in engaging and interrogating the complexities of science and technology education in Malawi, and in exploring Africa-based solutions to such complexities through regional and international collaboration. Finally, through participation in the project, considerable contributions will be made to the professional development and future supervision of the Master’s and PhD students at Chancellor College, University of Malawi.

Site Visits

Extensive arrangements were made by Mercy Kazima to enable Nyna, Bill and Alan to visit a range of school and educational contexts thereby offering cross-sectional insight into Malawi’s education system. Eight institutions were visited as outlined in Appendix A. At each site, we met with institutional heads, were given a tour of the site, made observations of science and maths lessons and held discussions with personnel (teachers, learners, and heads of department). These were valuable visits in which we had the opportunity to engage with persons with a profound understanding of local challenges, and to get a general “feel” of the sociopolitical, cultural and economic conditions impinging upon sustainable

development projects. The information we acquired regarding the education system, the challenges and possibilities thereof, provided a fruitful grounding for the forthcoming workshop.

We wish to stress the importance of the site visits. For example, the visit to Chiphoola Primary school, regarded as a “rural” institution by Malawians, allowed Nyna, Bill and Alan to interrogate our own understandings of “rural” from a South African perspective and to discuss our discursive interpretations with the staff of Chancellor College and the workshop participants. Another important insight was teachers’ impressive command of content knowledge, and pedagogical competency. Furthermore, a number of persons were recruited to participate in the workshops (researchers from the Malawi Institute of Education, the Deputy Principal of Domasi Teachers College, and teachers from the schools we visited. Participation based upon personal engagement and insight into the possibilities afforded by attending the workshop enabled the aims of the NARST LSEP - Project SUSTAIN collaboration to reach a wider audience.

The Workshop

The workshop was well attended, even on the national public holiday of Eid. Present were members of staff of Chancellor College; Project SUSTAIN research participants; and participants recruited from visits to schools, Domasi Secondary Teachers College, and the Malawi Institute of Education. Due to the mix of persons from various strands of education, the discussions were rich, contextualized, historicized and localized. The aims of NARST’s LSEP and Project SUSTAIN were, therefore, shared with a wider audience with a broader reach about the importance of community and sustainable development. There was a palpable energy to galvanize and foster an ethos of research around the core issues that are uppermost in the minds of Malawian educators. The final 1 ½ days focused upon each participant engaged in research proposal development and presenting their proposals to the group for comment and critique. This component of the workshop was highly interactive with the intent of clarifying each participant’s research focus, questions, and methodologies. Overwhelmingly the participants found this culmination to the capacity building workshop to be informative, constructive, and most beneficial. Participants offered comments such as:

I have learned a powerful source of research skills. I wish I had been able to attend the January workshop, but I will use all of the concepts I have learnt here to revisit my work in progress.

Developing my proposal has been an eye opener and very productive. As a student it has been an enjoyable experience because I have met intellectuals who have shaped my future perspectives on research issues of interest and concern to me. The criticisms were good and constructive.

I have learnt how to formulate a clear purpose of the study, how to come up with critical questions, and how to report research. I have also learnt what to look for when critiquing research articles and what reviewers are looking for when you submit an article. This will all be helpful to me in my future writings.

I have learnt so much on how to formulate a topic and purpose for my study and how to formulate research questions relating to the focus of study.

Feedback from participants indicated that their experience throughout the workshops was crucial for personal, professional, and national growth. The general consensus was the workshops were insightful and relevant. From the viewpoint of the presenters (Nyna, Bill and Alan), we also experienced the workshop as a learning event. Our collective work is grounded in the concerns of a context simultaneously similar in South Africa, yet, strikingly different from Malawi.

NARST LSEP Goals Accomplished: Developing Research Capacity and Partnerships

The research focus of Project SUSTAIN and the enhancement of science education for developing nations of NARST's LSEP were complementary and mutually supported. The visits to educational institutions were included in the week-long agenda, thereby ensuring that awareness of science education for development was extended beyond the ambit established by Project SUSTAIN and the conceptualization of Project SUSTAIN's research agenda.

This proved to be most beneficial as the workshop participants included classroom teachers interested in pursuing graduate degrees, graduate degree seeking students at Chancellor College, as well as educational leaders from higher education and the Ministry. All of the participants agreed that they should continue to meet on issues of mutual interest and concern in the future. They agreed there should be a closer linkage between educators engaged in classroom practice, curriculum development, national assessment, and higher education. Moreover, they realized they shared common interests with respect to ways to enhance educational opportunities for students, as well as ways to address issues of community and sustainable development. The participants – along with the support of members of staff of Chancellor College - hoped to be able to schedule regular seminar sessions in the future.

Collectively the group was grateful for the NARST initiative, which afforded individuals with disparate educational backgrounds but common interests, the opportunity to convene for the purpose of enhancing their research competencies. Ideally, the personal linkages will be sustained over time through electronic communication and face-to-face meetings at conferences. Connected by similar interests around research and development, it is obvious to all who participated in the NARST LSEP – Project SUSTAIN collaborative venture that there are reciprocal benefits from international partnerships, particularly amongst developing countries. More importantly, this collaborative venture also set the platform for networking and, based on comments of participants, a genuine belief about the ethical disposition of this joint venture for local development.

The Project SUSTAIN students from Malawi and several of the Project SUSTAIN staff presented at the 2009 SAARMSTE conference at Rhodes University in Grahamstown, South Africa (19 – 22 January) prior to the 2009 Project SUSTAIN week-long research workshop (24 – 28 January). Refer to Appendix B for a list of the 2009 SAARMSTE presentations.

Appendix A

REPORT ON NARST WEEK IN MALAWI

Nyna Amin, Bill Kyle, and Alan Pillay arrived from Durban, South Africa at 5.20 pm on Sunday 28 September 2008 at Blantyre Airport, Malawi. Mercy Kazima greeted them at the airport. While Nyna, Bill and Alan had communicated electronically with Mercy planning for the visit, this was the first time they had met. Mercy drove them to Zomba, where they arrived about 7.30 pm. They were accommodated at Hotel Masongola.

Mercy, who is a Senior Lecturer in Mathematics Education, assumed leadership for the Chancellor College involvement in Project SUSTAIN in March 2008. Prior to that Emmanuel Fabiano had been the liaison with Project SUSTAIN, but his administrative responsibilities as Principal of the College precluded his ability to be engaged actively on a daily basis.

We planned the week to have site visits on Monday and Tuesday, followed by the workshop from Wednesday through Saturday. The visits were planned so that Nyna, Bill and Alan could experience the Malawian context in which teachers work and in which students learn. It was also intended that during this time Nyna, Bill and Alan would meet key individuals who would be either participating in the workshop or who are educational leaders within the country. During the planning stage, Bill indicated the importance of meeting key individuals, visiting communities and schools at the outset of the visit in order to be able to draw upon the local experiences throughout the workshop. Becoming familiar with the local context would be essential for future communication with those engaged in research initiatives as well. Details of each day are as follows:

Monday 29 September

1. 8.00am – 10.00am: Visited Chiphoola Primary School in Zomba rural, where we were greeted by students upon our arrival. We did the following:



- (a) Brief meeting with the Head Teacher
- (b) Tour of the school, including brief observations of some classes in session



- (c) Full observations of lessons - Bill observed a Std 7 science lesson; Alan observed a Std 6 science lesson, Mercy and Nyna observed a Std 6 mathematics lesson



(d) Brief discussion with the Primary teacher advisor (who by chance was also visiting the school) and Head Teacher

(e) Group photograph

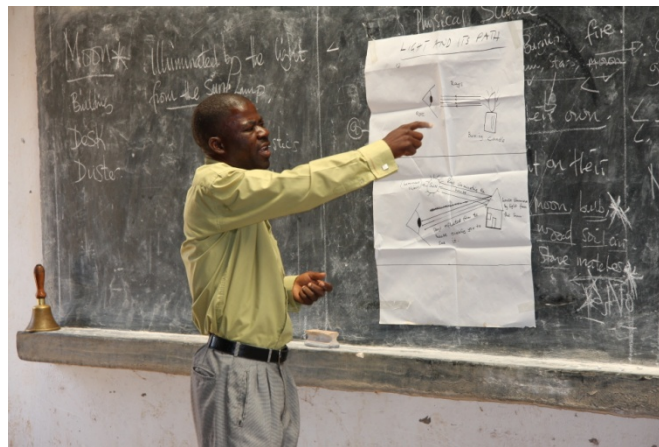


2. 10.30am-12.30pm: Visited Namadidi Community Day Secondary School in Zomba rural, where we did the following:

(a) Brief discussion with Head Teacher and Deputy Head Teacher

(b) Tour of the school, including brief observations of some classes in session

(c) Full observations of lessons of a Form 1 physical science lesson



(d) Some discussion with the teachers and Head Teacher

(e) Group photograph



3. 2.00pm-3.00pm: Visited Mulunguzi Secondary School, a district boarding school in Zomba urban, where we did the following:
 - (a) Brief discussion with Deputy Head Teacher
 - (b) Brief discussion with Head Teacher
 - (c) Observations of lessons of a Form 3 biology lesson
 - (d) Tour of the school including science laboratories
4. 3.30pm-5.00pm: Visited Malindi Day Secondary School, a double shift school in Zomba urban, where we did the following:
 - (a) Brief discussion with Deputy Head Teacher
 - (b) Brief discussion with Head Teacher
 - (c) Observations of lessons of a Form 3 biology lesson
 - (d) Tour of the school, including science laboratories

Tuesday 30 September

1. 8.30am – 10.30am: Visited Domasi Secondary Teachers College, where we did the following:
 - (a) Meeting with the Principal, the Registrar and the Dean of Humanities
 - (b) Tour of the College
 - (c) Tour of Demonstration Primary School, including brief observations of some classes in session
 - (d) Tour of Demonstration Secondary School, including brief meeting with Head Teacher
2. 11.00am-12.30pm: Visited the Malawi Institute of Education, a government department responsible for Malawi school's curriculum. We did the following:
 - (a) Meeting with some members of staff from various sections of the Institute.
 - (b) Visited their TALULAR teaching center (TALULAR is Teaching and Learning Using Locally Available Resources)



3. 2.00pm-2.45pm: Visited Zomba District Education Office where we had a meeting with the District Education Manager for Zomba
4. 3.00pm-3.15pm: Visited South East Education Division. Plan was to meet the Division Manager but he was not available as he was called to another meeting at Ministry headquarters
5. 3.30pm-5pm: Visited Chancellor College
 - (a) Toured the campus, in particular the library, laboratories and lecture rooms
 - (b) Visited the Centre for Educational Research and Training, where we had some discussion with the Deputy Director and a brief meeting with the Director

Wednesday 1 October – Saturday 4 October (Workshop Itinerary available from B. Kyle upon request)

Workshop in Room S at Chancellor College: participants across the four days included the following:

3 Project SUSTAIN students

3 members of staff from Chancellor College science education section of the Faculty of Education

5 members of staff from Malawi Institute of Education

4 science education Master's students and prospective students

4 members of staff from Domasi College of Education

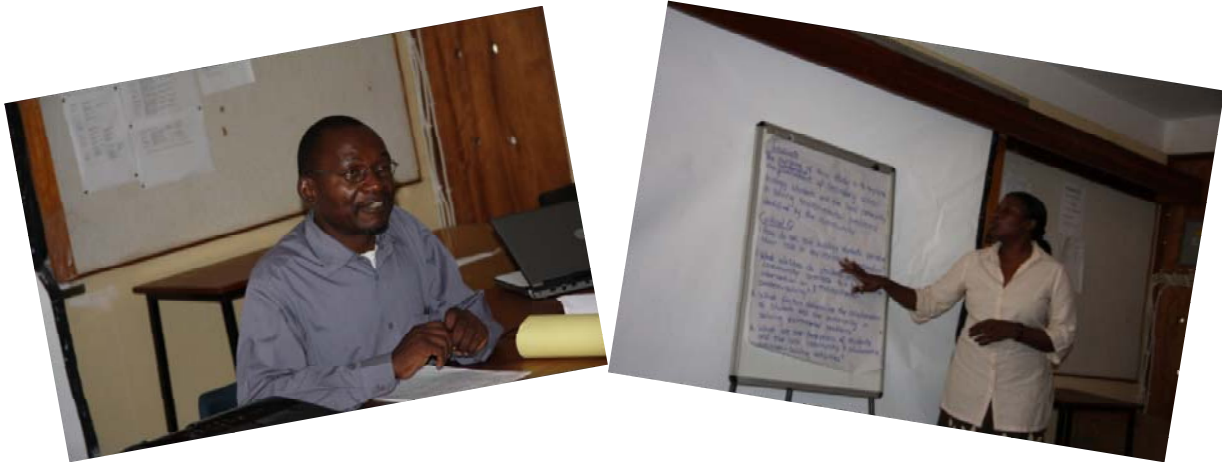
3 teachers from Chiphoola Primary School

1 member from the Centre for Educational Research and Training



Workshop reflections by Mercy Kazima:

The workshop went extremely well. We covered all aspects that were planned in the programme. Bill, Nyna and Alan engaged with the participants and involved them as much as possible. The participants were very active and participated well throughout the workshop. Each participant was able to produce a research proposal as was expected, and each proposal was presented and discussed by the whole group in some detail. These discussions gave the participants good feedback to consider when revising their proposals.





I personally found these sessions very useful, and I think they were also very useful to the participants. The team also involved members of staff from the Faculty of Education, especially me (Mercy) and Emmanuel in leading discussions during the workshop. In short I would say the workshop was very successful.

At the end of the last day, we asked participants to evaluate the workshop by answering three questions: 1. What are your reflections of the workshop? 2. What did you learn? 3. What would you suggest for future workshops? Written responses were collected by the team.

At the conclusion of the workshop, Dr. Emmanuel Dzama gave a short speech on behalf of the participants and Faculty of Education. In his speech he thanked the team for their generosity to spare time to come to Malawi and work with us. Dr. Dzama said something interesting about his original suspicions when he heard about Project SUSTAIN. He said he thought it was one of those projects that only aim at getting funds from the Norwegian government without really much concern about what the project claims to do. He said he was happy to learn that Project SUSTAIN is really interested in sustainable and socially responsive science education and working hand-in-hand with us. And, he thanked NARST for the support that made this week possible. He is hopeful there will be future opportunities for the team to visit.

Saturday afternoon after the workshop was closed, the team (Bill, Nyna, Alan, Mercy and Emmanuel) went to Zomba Mountain for some sightseeing and a farewell dinner. Emmanuel Fabiano, Principal of Chancellor College of the University of Malawi, joined us for dinner and to thank the team for their valuable contributions during the week.

Bill, Nyna and Alan left Zomba on Sunday 5 October at 4.30am to catch a flight to Johannesburg at 7.00am from Blantyre.

It was wonderful to meet Bill, Nyna and Alan, and it was such a pleasure to have them with us here in Malawi. I look forward to working with them in the future.

Appendix B

Presentations at the 2009 SAARMSTE Conference (19-22 January 2009, Grahamstown, South Africa)

PROJECT SUSTAIN STUDENTS from Malawi

Connic Machira (C. Machira was unable to attend the conference; he passed away on 25 January 2009)

An investigation of the influence of social scientific issue-based teaching of science on participation and creativity of learners

Liveness Mwale

Learners' mathematical proficiency on fractions: A study of two primary schools in Malawi

Andrews Nchessie

Combating deforestation with "Green" stoves in two communities in Kasungu

Andrews Nchessie

Promoting creativity in primary science and technology teaching and learning

Nameson Ngwira

An investigation of factors that motivate learners to study physical science at MSCE level in Malawi

Alice Nsanga

The effects of problem-based learning in the context of local communities as an instructional strategy for senior secondary environmental biology

PROJECT SUSTAIN STAFF

Nyna Amin

Once were learners: Subject formation and great, grand, political and personal narratives in mathematics

Mercy Kazima

Teaching mathematics in local languages: Lessons from some African countries

William C. Kyle, Jr.

Public deliberation as methodology: Participatory democracy and action

Dorothy Cynthia Nampota

Exploring strategies for effective teaching and learning of physical science in Malawi

Ash Pillay & Busisiwe Alant

Tracing interfaces using actor network theory

Astrid Sinnes, Birgitte Bjønness, and Nina E. Arnesen

Teaching science education for sustainable development: How do we prepare the student teachers?