

Trip Report: Malawi

Dates: September 25 – October 4, 2015

Travellers: Dr. George Glasson School of Education, Department of Teaching and Learning; Dr. Josiah Tlou, Center for Research and Development in International Education and Ms. Johanna Cricenti, Office of International Research, Education and Development, Virginia Tech

Institution(s): Virginia Tech, Lilongwe University of Agriculture and Natural Resources (LUANAR), Malawi Ministry of Education: Secondary School Education, Department of Teacher Education and Development, Lilongwe Girls Secondary School, Malawi Institute of Education, Mzuzu University, Malawi Assemblies of God University, Tikwonde Freedom Gardens

Sites Visited:

Workshop venue, conference meeting centers and Ministry of Education offices in Lilongwe, Malawi. Tikwonde Freedom Gardens field visit site.

Background:

In 2014, Lilongwe University of Agriculture and Natural Resources (LUANAR) developed a concept note describing the current AET challenges faced in Malawi and possible activities to address these issues. This concept note was presented to the USAID mission in Malawi. James Sitima, the Head of the Agriculture Education Department at LUANAR, met with Lynn Schneider, John Edgar and Carol Jenkins at the Mission.

The concept note was structured around three primary activities including:

- 1) Mid-professional training and capacity development
- 2) Improving science pedagogy in secondary schools, and
- 3) Strengthening administrative capacity

These activities align with the Malawi Agricultural Sector Wide Approach (ASWAp) and Millennium Development Goals (MDGs). At LUANAR the concept note involved collaboration between James Sitima and the Vice Chancellor, the Head of Crop and Soil Science, the Head of Natural Resources, Head of Animal Science, Head of Agribusiness, the Dean of Food and Human Science and the Dean of Development Studies. It also has the support of the Ministry of Agriculture, Ministry of Education and Ministry of Gender, Women and Children Affairs. The concept note was framed as a possible collaboration with

Virginia Tech’s InnovATE team based on a long history of engagement between Virginia Tech and Malawian education institutions.

In 2015, InnovATE and the Virginia Tech team held a number of conference calls with Mr. Sitima to develop a workshop designed to introduce modern teaching strategies for Science and Agriculture teachers in secondary schools and to explore a proposal for establishing a certificate program to raise the quantity and quality of these educators.

Objectives of the workshop:

- 1) Introduce current Science Technology Engineering and Mathematics (STEM) pedagogies and curriculum ideas for better preparing science and agriculture teachers in the context of the local education system.
- 2) Discuss opportunities for course delivery through Open Distance Learning (ODL) for increased accessibility.
- 3) Develop a Certificate Program Proposal in STEM Education for secondary teachers. The final product will specify relevant topics and pedagogies for the Certificate as well as plans for moving forward with implementation.

Description of Activities:

InnovATE led a three day event “**Malawi STEM Education Workshop: Development of a Certificate Program for Secondary School Agriculture and Science Teachers**” in partnership with Lilongwe University of Agriculture and Natural Resources (LUANAR) on place-based STEM education for university professors, administrators, and ministry officials at the Wamkulu Palace Hotel and Conference Center in Lilongwe, Malawi. The workshop promoted the development of a STEM Education Certificate for secondary school agriculture and science teachers.

Participants were introduced to the concept of place-based STEM education which is designed to provide a way for teachers and communities to prepare children to become participants in local problem-solving. Johanna Cricenti, Program Manager of InnovATE, discussed experiential learning and designing course work and engagement opportunities for entrepreneurial and workforce-ready skills development.

Dr. George Glasson of Virginia Tech modeled inquiry-by-design pedagogies that engage learners in problem solving. He emphasized the importance of connecting STEM education to local community resources. By example, Mr. Daniel Chinkuntha, an agriculture expert with the Tikondwe Freedom Gardens in Malawi, described how the Freedom Gardens used mobile phones to connect schools with traditional agricultural practices to enhance nutrition and sustainable food security. The participants generated ideas on the courses, resources, and experiences needed for science and agriculture teachers to improve their pedagogy in STEM subjects.

Dr. Josiah Tlou of Virginia Tech led discussions of how the STEM curriculum might be delivered through Open Distance Learning. He presented an update on the New Partnership for Africa’s Development (NEPAD) e-schools initiative and the implications of that initiative for Malawi. Dr. Tlou and Dr. Ndalapa Mhango, distance learning specialist, led a discussion of the challenges of implementing technology and distance learning for an agriculture curriculum. The participants generated a list of the resources,

infrastructure and skills needed to implement distance learning, and Dr. Tlou led a session on identifying potential funding sources.

The goal of the workshop was to set in motion a process for the establishment of place-based STEM education in Malawi supporting USAID Malawi cross-cutting SIR 1 *Capacity of institutions improved* and SIR 2 *Use of technology and innovation increased*. STEM education provides “a way for teachers and communities to prepare children to become participants in local problem-solving.”

Action Items:

Follow-up will be important to build on the workshop and stakeholders meetings to continue the discussion. The intermediate goal is to design a program that will develop strategies and prescribe an investment to improve capacity of Malawian institutions and educators in science and agriculture and to integrate STEM concepts and pedagogy into the secondary school curriculum.

Our suggestions for follow-up to the workshop include the following:

- 1) Complete a review of the new science education curriculum in Malawi to plan for future STEM pedagogy workshops related to the development of a Post-graduate STEM Certificate.
- 2) Complete a needs assessment of potential qualified teachers that may participate in the Post-graduate STEM Certificate Program. An assessment of teacher shortages and under-qualified teachers will also be necessary for future planning to meet the demands for science teachers in Malawi.
- 3) Investigate Internet connectivity with NEPAD e-Schools in Malawi. The internet connecting will enhance distance learning capabilities with the proposed Post-graduate Certificate STEM program, especially in remote areas.

Further Suggestions and Recommendations:

- 1) Consider developing a Professional Development Model in which InnovATE/Virginia Tech faculty conduct professional development workshops with higher education faculty in Malawi who are responsible for preparing teachers in the STEM fields. This approach supports local HICD as Malawian faculty members would then be responsible for educating future STEM teachers at participating institutions throughout Malawi. A similar model was successfully implemented with Virginia Tech's UPIC project in Malawi (2001-2006) (see attached documents). In this project, 35 Malawian educators received advanced degrees (6 Ph.D. and 29 MAED). The graduates from the UPIC project became instructors to start a self-sustaining B.Ed. program. As of today, 8 cohorts or 350-400 have graduated at Domasi College with a degree specializing in pedagogy for the Primary Teacher Education and were deployed in the 6 Teacher Training Colleges (TTCs) and other sectors of the education system. Many of the B.Ed. graduates are tutors at the TTCs and others have joined NGOs or the Ministry of Education across the country. Nine of the UPIC masters students have upgraded themselves to the PhD levels and are taking leadership positions in the Malawi Education system and in higher education. Some of these individuals were selected participants at this STEM education workshop and have taken the ideas and methods presented at the training back to their own faculty and departments. Similarly, we envision the STEM certificate program, developed in collaboration with LUANAR

and the Ministry, to be self-sustaining with a critical mass of Malawian faculty prepared to implement the program at locations and institutions of higher education nationwide.

- 2) Recently, a new curriculum in Science Education has been developed through the Ministry and the Malawian Institute of Education (MIE). This curriculum provides more practical applications of science education and is consistent with STEM pedagogical approaches. As discussed with officials from LUANAR and the Ministry, Virginia Tech faculty would assist Malawian educators in developing STEM pedagogies to support the new curriculum.
- 3) The STEM pedagogical approaches in a Post-graduate STEM Certificate Program would be consistent with achieving the stated goal for science education in Malawi identified by the workshop participants: Science Education should provide opportunities for graduates to improve the socio-economic conditions of the country. To accomplish this goal, the STEM pedagogy would focus on problem solving, inquiry, and critical thinking necessary for workforce development in the agricultural and business sectors of Malawi. The pedagogy should be contextualized in Malawian culture and be gender inclusive.

Appendices:

Appendix 1 – List of Contacts Made

Appendix 2 – Trip Log

Appendix 3 – Agenda for the Workshop

Appendix 4 – Results of Workshop Feedback and Evaluation

Appendix 5 – UPIC Final Evaluation

Appendix 1 - List of Contacts Made:

Name	Title	Organization	Contact
Dr. Japhet Mchakulu	Deputy Dean	Lilongwe University of Agriculture and Natural Resources (LUANAR)	jmchakulu@luanar.bunda.mw japhet.mchakulu@googlemail.com
Dr. Martin Gulule	Director of Student Affairs	LUANAR	mgulule@yahoo.com
Dr. Felix Maulidi	Head of Agricultural Education Department	LUANAR	felix.maulidi@bunda.luanar.mw
Dr. Tasokwa Kakota	Lecturer, Basic Sciences	LUANAR	tasokwakakota@yahoo.co.uk
Mr. Aaron Mapondera	Lecturer, Testing Measurement and Evaluation	LUANAR	amapondera@bunda.luanar.mw
Mr. James Sitima, Coordinator	Lecturer, Agriculture Education Department	LUANAR	sitimajames@yahoo.com
Mrs. Chikondano Mussa	Director of Secondary School Education	Ministry of Education	
Mr. Samuel Chibwana	Principal Education Officer	Ministry of Education	samuelchibwana@yahoo.com
Mr. Enoch Chinomba	DTED Representative	Ministry of Education	
Ms. Rebecca Chindenga	Secondary School Teacher	Lilongwe Girls Secondary School	chindengar@yahoo.com
Ms. Ellita Kaudzu	Secondary School Teacher	Lilongwe Girls Secondary School	ezmkaudzu@gmail.com
Dr. William Susuwele-Banda	Director	Malawi Institute of Education	wsususele@gmail.com
Mrs. Evelyn Lemani	Gender and Curriculum Specialist	Malawi Institute of Education	evelemani@yahoo.co.uk
Dr. Ndalapa Mhango	Distance Education Specialist	Malawi Assemblies of God University	ndalapa@yahoo.uk
Mr. Patrick Luntha	Head of Chemistry Department	Mzuzu University	pluntha@yahoo.co.uk
Mr. Daniel Chinkhuntha	Tikondwe Freedom Gardens	Agricultural Expert	danielchinkuntha@gmail.com
Dr. Amy Nagy	AAAS Fellow	USAID Bureau for Food Security	lola.nagy@gmail.com
Mr. Cullen Hughes	Director of Economic Growth Division	USAID/Malawi Mission	chughes@usaid.gov
Mrs. Lonely Magreta	Principal Secretary EST	Ministry of Education	magretalv@yahoo.co.uk
Mr. Felix Ungapembe	Education Officer Secondary	Ministry of Education	felix.ungapembe@gmail.com
Dr. Phillip Kaonda	University Registrar	LUANAR	
Prof. Emmanuel Kaonda	Deputy Vice Chancellor	LUANAR	dvc@bunda.luanar.mw

Appendix 2 -Trip Log

Friday September 25

Dr. Glasson and Dr. Tlou departed Blacksburg/Roanoke for flight to Atlanta; Ms. Cricenti departed Washington D.C. for Atlanta. Team travels onto Johannesburg, SA then onto Lilongwe.

Saturday September 26 Johannesburg to Lilongwe

Arrived 9:00 pm. Met by driver from LUANAR. Checked into Wamkulu Palace.

Sunday September 27

Walked to Capitol Hill area for banking and groceries. Dr. Amy Nagy arrived at 12:00 pm. VT team met with James Sitima and prepared the meeting room, audio visual equipment and materials for workshop.

Monday September 28

8:00 am – 5:00 pm First day of the workshop – see full schedule for the workshop in Appendix 2. Some of the order for the first day was amended as the LUANAR and Ministry of Education delegations arrived late due to miscommunication and alternate events scheduled in conflict of the workshop opening. Cullen Hughes, Director of Economic Growth Division at USAID Malawi Mission, addressed the participants at the opening of the workshop and remained for the first portion of Dr. George Glasson’s presentation on introducing STEM into the Malawian mindset and curriculum.

Tuesday September 29

8:30 am -4:30 pm Conducted second day of the workshop - see full schedule for the workshop in Appendix 2.

5:00 pm – 6:30 pm Team debriefed with James Sitima and Dr. Ndalapa Mhango

Wednesday September 30

Conducted last day of the workshop - see full schedule for the workshop in Appendix 2

Thursday October 1 - Travel to Dowa

9:00 am – 3:00 pm Visit to Tikwonde Freedom Gardens hosted by Daniel Chinkuntha. Team traveled with James Sitima in LUANAR vehicle and accompanied by Dr. Amy Nagy and Dr. Ndalapa Mhango. Mr. Chinkuntha gave an overview presentation of his organization and the teaching and learning opportunities offered at the classroom onsite. Team spent a half day tour of the gardens and had a meal prepared by the local women’s organization. Daniel Chinkuntha is owner and Director of the Tikwonde Freedom Garden and was the key stakeholder farmer in the development of the Mobile Malawi Curriculum (a sustainability science curriculum connecting organic farmers with primary school classrooms using mobile phones).

8:00 pm Team met with Dr. Phillip Kaonda, University Registrar at LUANAR and Dr. Felix Maulidi, Department Head of Agricultural Education at LUANAR accompanied by James Sitima and Dr. Ndalapa Mhango at Golden Peacock Hotel.

Friday October 2

8:30 am – 10:00 am Team met with Mr. Samuel Chibwana, Principal Education Officer and Mrs. Lonely Magreta, Principal Secretary for Education, Science and Technology at the Ministry of Education accompanied by James Sitima and Dr. Amy Nagy.

Afternoon spent time compiling notes, outing at local market, reconciling with hotel and conference center and packing for departure.

Saturday October 3

8:30-9:30 am Team met with Dr. Emmanuel Kaunda, Deputy Vice Chancellor at LUANAR accompanied by James Sitima, Dr. Felix Maulidi and Dr. Amy Nagy.

10:00 am Travel to airport in LUANAR vehicles.

1:00 pm Depart for Johannesburg via Blantyre.

Sunday October 4

11:00 am Arrive Roanoke via Atlanta.

Appendix 3 - Agenda for the Workshop

Day 1			
Time	Topic	Facilitator/ speaker	Notes/description
8:00-8:30	Welcome and introduction of participants	Mr. James Sitima	
8:30-8:45	Introductory remarks	USAID Mission	
8:45-9:15	Workshop goals	Dr. George Kanyama-Phiri	Overview of the purpose and goals of the workshop. Introduce the idea of a Certificate Program in STEM Education in Malawi. Allow participants to contribute to the goal setting.
9:15-9:45	Overview of science and agricultural teacher education in Malawi	Mrs. Chikondano Mussa	Mrs. Mussa will provide an overview of the structure and content of agricultural teacher education in Malawi.
9:45-10:00	Break		
10:00-11:00	Group identification of goals for student learning, challenges and needs, and ideas for success in science and agriculture teacher education and curriculum development.	Dr. George Glasson and Dr. Josiah Tlou	Dr. Glasson and Josiah Tlou will lead a discussion and generate a preliminary list of needs, constraints and issues in science and agriculture teacher education and curriculum development. The facilitators will tie these issues to the development of a Certificate Program in STEM Education.
11:00-12:00	Teacher preparation in Science-Technology-Engineering-Mathematics (STEM) education	Dr. George Glasson	Dr. Glasson will discuss the importance of place-based STEM education for improving student achievement in science and agricultural education. Participants will be introduced the U.S. Next Generation Science Standards (2013) and the rationale for preparing teachers to implement problem-solving and inquiry pedagogies in their classrooms. Examples of place-based STEM education curriculum and lesson plans will be shared.
12:00-12:30	Questions and answer session	Dr. George Glasson	Participants will have a chance to ask questions and discuss the applicability of place-based STEM Education in the Secondary Science and Agricultural Teacher Preparation Programs in Malawi.
12:30-1:30	Lunch		
1:30-2:45	Gender issues in Malawi's secondary schools	Mrs. Evelen Lemani	Mrs. Lemani will facilitate a discussion about important gender issues in secondary schools. She will provide some ideas of how these issues can be addressed, especially through improvements to curriculum and pedagogy.
2:45-4:00	Experiential Education and Entrepreneurship	Ms. Johanna Cricenti	Ms. Cricenti will discuss developing curriculum around place-based experiential agricultural education. Focus will be on designing course work and engagement opportunities for entrepreneurial and workforce ready skills development.

Day 2			
Time	Topic	Facilitator/ speaker	Notes/description
8:30-8:45	Recap from Day 1	Johanna Cricenti	Overview of the main ideas and accomplishments made in Day 1.
8:45-10:15	Place-based STEM education: Pedagogy and practice in science and agricultural education	Dr. George Glasson	Dr. Glasson will discuss and model inquiry-by-design pedagogies that engage learners in problem solving and design in STEM subjects. The 5-E Learning Cycle (Engage, Explore, Explain, Elaborate, Evaluate) will be introduced as a teaching model to engage learners in active learning using locally available resources. The importance of connecting STEM education to local community resources will be emphasized, with examples shared from other sites throughout the world.
10:15-10:30	Break		
10:30-11:45	Mobile Malawi Project	Dr. George Glasson Mr. Daniel Chinkuntha	Dr. Glasson will discuss a pilot project in Malawi designed to use mobile phones to connect schools with traditional agricultural practices to enhance nutrition and sustainable food security. The Mobile Malawi Curriculum that was delivered on mobile phones will be shared (www.soe.vt.edu). Mr. Chinkuntha will discuss the role of Tikondwe Freedom Gardens in agricultural education with local schools and global partners.
11:45-12:30	Brainstorm place based STEM lesson plans	Dr. George Glasson	Participants will share their ideas for designing place based learning modules.
12:30-1:30	Lunch		
1:30-2:30	The New Partnership for Africa's Development (NEPAD)	Dr. Josiah Tlou	Dr. Tlou will discuss the NEPAD e-School-Initiative Programs. This program is bringing technology to the schools in Sub-Saharan Africa through fiber optics. The progress and potential of the NEPAD program will be discussed in relation to Malawian STEM education.
2:30-3:30	Distance Learning in Sub-Saharan Africa	Dr. Ndalapa Mhango	Dr. Mhango will discuss his role of Coordinator of Distance Learning in Sub-Saharan Africa and the issues/challenges involved with implementing distance learning in Malawi.
3:30-3:45	Break		
3:45-4:30	Opportunities and challenges for using technology and distance learning	Dr. Josiah Tlou and Dr. Ndalapa Mhango	Round table discussion on the implementation of technology and distance learning in place-based STEM education will be facilitated. A summative list of issues involved with the implementation of technology and distance learning in Malawi will be generated.

Day 3			
Time	Topic	Facilitator/ speaker	Notes/description
8:30-9:00	Recap of days 1 and 2	Johanna Cricenti	Overview of the main ideas and accomplishments made in Day 1. Review the issues outlined on day 1.
9:00-9:15	Overview of the goals for the day	Johanna Cricenti	The goal of Day 3 is for the participants to outline a plan for a Certificate Program in STEM Education in Malawi. The goal and topics for the day will be discussed.
9:15-10:00	Curriculum Development	Dr. George Glasson	The discussion will focus on potential changes to the existing curriculum for science and agricultural teacher preparation. What resources, courses, and experiences are needed to better prepare teachers in place-based STEM education?
10:00-10:15	Break		
10:15-11:00	Pedagogical practices and teacher preparation	Dr. George Glasson	The discussion will focus on how to prepare teachers in place-based STEM teaching pedagogies. What courses, resources, and experiences are needed for science and agricultural teachers to improve their pedagogy in STEM subjects?
11:00-11:30	Use of technology and distance learning	Dr. Josiah Tlou and Dr. Ndalapa Mhango	The discussion will focus on the implementation of technology and distance learning for a Certificate Program in STEM Education. What resources, infrastructure, and skills are needed?
11:30-12:30	Structuring a STEM Certificate program	Dr. George Glasson	Participants will discuss how the Certificate might be structured and implemented.
12:30-1:30	Lunch		
1:30-2:15	Identifying potential funding sources and partners	Dr. Josiah Tlou	The discussion will focus on identifying potential funding sources for development of a Certificate Program in STEM Education. What resources are needed? What is the timeline for implementation of a certificate program? What other issues need to be addressed?
2:15-2:30	Break		
2:30-3:30	Steps for moving forward	Johanna Cricenti Dr. George Glasson Dr. Josiah Tlou	This final session will provide time for participants to outline concrete steps and action items for moving forward with the plan to create a Certificate Program in STEM Education. Workshop evaluations will be completed.
3:30-4:00	Adjournment		

Appendix 4 – Results of Workshop Feedback and Evaluation

Day 1 Feedback

1. What are three top take aways or things you learned today?	2. What part of the place based STEM education concept needs more explanation?	3. What are important needs or constraints to address for science and agriculture teacher training and curriculum?
1. STEM Education 2. Gender issues- confusion! 3. Innovate a possible option for resources.	It takes the local context- no imposition from outside.	Practice examples involving students! STOP theorizing the activities with students.
<ul style="list-style-type: none"> - Gender not only considering one sex, only to minimize differences. - The difference between entrepreneurship and entrepreneurship education. 	<ul style="list-style-type: none"> - It is human needs approach (Human Based Approach). 	<ul style="list-style-type: none"> -Practical and skill development -Resources
<ul style="list-style-type: none"> -Place-based STEM Education -Need for implementing strategies that are gender-sensitive -STEM education- lesson planning: key to successful learning. 	Importance of the local environment in the implementation of STEM education.	Assessment of practical aspects of agriculture, and making sure that they (assessments) are valid and reliable.
1. Students learn science better if they are engaged-- hands on. 2. Importance of Hybrid Knowledge-- integrating local knowledge with scientific knowledge. 3. Experimental learning is vital in Agricultural Training & Education.	<ul style="list-style-type: none"> -Students should have hands on experience. - Engage students to discover ideas on their own. - Use locally available materials-- be innovative and creative. 	Needs <ul style="list-style-type: none"> - Human resource development - Infrastructure Constraints <ul style="list-style-type: none"> - Resources - Teaching and learning environment

1. What are three top take aways or things you learned today?	2. What part of the place based STEM education concept needs more explanation?	3. What are important needs or constraints to address for science and agriculture teacher training and curriculum?
1. Develop pedagogies based on indigenous knowledge in science. 2. Gender issues affecting teaching and learning in schools. 3. InnovATE's approaches-learn, assign, train.	Importance of place-based STEM education for improving student achievement in science and agricultural education.	<ul style="list-style-type: none"> - Resources - Skills/content
<ul style="list-style-type: none"> - Place-based learning - The Hybrid Knowledge - The 5-E Lessons 	<ul style="list-style-type: none"> - Brings interaction between the students and the stakeholders. 	<ul style="list-style-type: none"> - Skilled facilitators - Research areas & practicals - Books for teachers and students
<ul style="list-style-type: none"> - Need to incorporate practical work in science subjects. - Need to change mindset of students and teachers to love science subjects. 	Child control.	<ul style="list-style-type: none"> - Include methodology in the curriculum. - Include more hands on experience.
1. How Science Technology Education can be delivered with practical element. 2. Preparing teachers for STEM. 3. The use of local resources for STEM. 4. InnovATE and the question of entrepreneurship in STEM.	It works best when the lesson is delivered with a practical element involving learners hands-on experience solving local problems with local resources.	<ul style="list-style-type: none"> - Resources for practical teaching - Qualified teacher who can provide a practical element. - Relevant curriculum.
i. Stem as a concept. ii. Main objective of innovATE. iii. The aspect of collaboration in order to achieve meaningful change.	It is all about connecting local knowledge and experiences to modern science-- currently not evident in the Malawian secondary school curriculum.	<ul style="list-style-type: none"> - Human resource to delivering the program. - Resources/materials to support the implementations in the project. - Understanding of the current situations.
Issues in education, experiential education & entrepreneurship, learning & curriculum development.	Relationship building, religious knowledge, and modern technologies and the environment.	<ul style="list-style-type: none"> -Resources - Capacity building of Human (training)

1. What are three top take aways or things you learned today?	2. What part of the place based STEM education concept needs more explanation?	3. What are important needs or constraints to address for science and agriculture teacher training and curriculum?
1. Organization of STEM education. 2. Incorporating gender issues in STEM education. 3. Making Agriculture part of the STEM education.	1. While content is important , emphasis should be on the process of learning. 2. Pedagogies of STEM Education should be practically oriented. 3. Learners should be engaged in critical thinking activities.	1. Capacity building to prepare trainees of teachers. 2. Needs for mobilization of resources. 3. Gender balance issues should be properly organized to make both males and females understand the importance of affirmative action.
A) Developing STEM program (How to develop). B) Gender issues in schools- Malawi (How to incorporate). C) Place based education.	A) It is interactive and exploratory in nature. B) Requires creativity and commitment. C) Challenges learners to be interactive.	A) Needs: - Curriculum responsive to needs of stakeholders e.g. quality and qualified teachers. - Adequate teaching and learning resources. B) Constraint: - Limited institutional staff capacity - Resources for training students for example T/L materials and funds - PPP (Public Put Partnership)
1. The STEM programme objectives. 2. The Science teacher preparation programmes. 3. Essentials of Entrepreneurship.	That is uses the local resources, cultural expectations, and local environment.	- Education on appropriate methodologies. - Education on how to conduct practical lessons. - How to make teaching and learning materials from locally available resources.

Day 2 Feedback

1. What part of the place based STEM pedagogies need more explanation?	2. What are important needs or constraints to address for Open Distance Learning for a certificate program in STEM pedagogy in Malawi?	3. How do you see STEM education connecting to local communities?
<ul style="list-style-type: none"> - To impart skills and knowledge to students who can go out and teach learners using participative approach. 	<ul style="list-style-type: none"> - Should be inclusive. - Should be easily accessible to everyone. - Should receive support from stakeholders and students themselves. 	<p>There is high possibility it is happening provided it receives support from community, stakeholders, and students themselves.</p>
<ul style="list-style-type: none"> - To facilitate/ensure inquiry learning. - Engage secondary school students in problem solving experiences; using the local environment itself. 	<ul style="list-style-type: none"> - Poor internet connectivity. - Negative mindset on ODL. - Political will. - ICT literacy. 	<p>STEM education is a tool for solving local communities' problems. Providing solutions to the local community.</p>
<ul style="list-style-type: none"> -Due to the large number of students, teachers may choose to just lecture. - In an attempt to finish the national syllabus and prepare students for national exams, teacher may put aside creative STEM pedagogies and use rote learning. 	<p>Mode of delivery</p> <ul style="list-style-type: none"> - Printed materials may isolate learners - Electronic (internet) may be costly due to cost of broadband. <p>Teachers/educators who have the ability to teach STEM to student teachers.</p>	<ul style="list-style-type: none"> -Use of the local culture and environment. - Teachers are likely to understand the language of the customs.
<ul style="list-style-type: none"> - Helping learners to learn by inquiry. - Learners are engaged, explore through hands on, explain, elaborate and evaluate the learning. 	<ul style="list-style-type: none"> - Lack of political will - Delivery tools - Support systems 	<ul style="list-style-type: none"> - It will only be possible if mode of delivery is properly chosen. - Use of blended modes will connect STEM education to local communities.
<ul style="list-style-type: none"> - To create a spirit of inquiry among learners. - To promote creativity and knowledge creation. 	<ul style="list-style-type: none"> - Capacity of staff. - Enough facilities and resources. - ICT <p>Constraints:</p> <ol style="list-style-type: none"> Purpose of program Environment Technology 	<ol style="list-style-type: none"> Use of ingenious knowledge. Community participation and support. Through traditional mode of delivery.

1. What part of the place based STEM pedagogies need more explanation?	2. What are important needs or constraints to address for Open Distance Learning for a certificate program in STEM pedagogy in Malawi?	3. How do you see STEM education connecting to local communities?
<ul style="list-style-type: none"> - Will make learning less costly but relevant and effective. - The community will benefit from knowledge generated by learners. 	<p>Needs:</p> <ul style="list-style-type: none"> - Appropriate infrastructure. - ICT Facilities (Availability) - Building capacities of lecturers to use critical pedagogy. <p>Constraints:</p> <ul style="list-style-type: none"> - Upgrade ICT infrastructure - Resource constraints. 	<ul style="list-style-type: none"> - Very possible if planned well in consultation with the community. - Community to also benefit from knowledge generated from STEM project.
<p>Encourage both teachers and learners to actively participate with creative and innovative ideas which are present in their localities.</p>	<ul style="list-style-type: none"> - Mode of doing ODL - The cost implication 	<ul style="list-style-type: none"> - There are structure in the local communities that can probably support. - There is so much of background information in link with the programme.
<ul style="list-style-type: none"> - Providing opportunity for practice based learning. - Widens the knowledge of learners for critical thinking, finding solutions, and designing. 	<ul style="list-style-type: none"> - Learning materials need to be adequate. - Problems with e-learning manual. - Costly in terms of producing learning materials. 	<ul style="list-style-type: none"> - Provide wholesome lessons on main practical issues. - Combines both indigenous and scientific knowledge. - Improves interaction of learners and the communities.
<ul style="list-style-type: none"> - To engage students in discovering theories and new ideas. - Enables students to use their local knowledge (past experiences) in building new knowledge. 	<p>Need:</p> <ul style="list-style-type: none"> - Capacity building in ICT use - ODL Policy of delivery - Strategic planning, 5 INDT Analysis <p>Constraints:</p> <ul style="list-style-type: none"> - Political will - Use of ICT - Availability of ICT Technologies 	<ul style="list-style-type: none"> - Through ODL- use of ICT to access information - Using local communities as resources for learning and delivering lessons.

1. What part of the place based STEM pedagogies need more explanation?	2. What are important needs or constraints to address for Open Distance Learning for a certificate program in STEM pedagogy in Malawi?	3. How do you see STEM education connecting to local communities?
<p>Engages learners in active learning using locally available resources. By engaging learners in problem solving and design in the process, the learners develop that deep appreciation of the place enhancing their attitudes towards science, technology, engineering, and mathematics. The end product is a critical thinker.</p>	<ul style="list-style-type: none"> - Lack of support from politicians. - Under-funding. - Lack of ICT conversant staff to drive the program. 	<p>By learning from elders for example, the community is involved. Knowledge from community is passed on to the learners.</p>
<p>This can maximize interaction among learners whereby learners can learn from each other as additional information from the classroom. Classroom should not bind learners from learners learning from each other.</p>	<p>Mind set of majority whereby they think ODL is a second option. Mode of delivery as compared to face to face. This mindset and thinking has to be changed.</p>	<p>This will help to create a network among learners (what they do in a classroom) and how they can relate it to every day life in their local communities. It will also help to allow people from local communities to contribute towards improved learning.</p>

Day 3 Feedback

1. What resources, courses and experiences are needed to better prepare teachers in place-based STEM education?	2. What is needed for agriculture and science teachers to improve their pedagogy in STEM subjects?	3. What resources, skills and infrastructure is needed to implement technology and distance learning for a Certificate Program in STEM education?	4. What other issues need to be addressed?
<p>Resources:</p> <ul style="list-style-type: none"> - Human resources (academic as well as support staff) - Financial Resources - Infrastructure, ICT, T/L Materials (books, lab equipment, ect.) <p>Courses:</p> <ul style="list-style-type: none"> - Education foundation courses. - Science education courses (how to teach). - STEM knowledge <p>Experience:</p> <ul style="list-style-type: none"> - ICT skills, assessment skills, research skills - Assembling staff, pedagogy staff, content-knowledge 	<ul style="list-style-type: none"> - Knowledgeable human resource both academic and support staff - Financial resources - ICT skills - Relevant curriculum - STEM knowledge/curriculum - Laboratories, libraries 	<ul style="list-style-type: none"> - Human resources - Infrastructure (laboratories, libraries) - ICT Skills - Satellite centers - Assessment skills 	<ul style="list-style-type: none"> - There is need to systematically understand the target group for STEM education - The mode of delivery either face-to-face or ODL Mode and why it is ODL mode, is it if a pure face-to-face or blended?
<ul style="list-style-type: none"> - Human resources, financial resources - Courses should be on methodology - Experiences on ICT 	<ul style="list-style-type: none"> - Communication facilitation, evaluation skills - ICT information 	<ul style="list-style-type: none"> - Human resources, financial resources - Evaluation skills - Laboratories, libraries 	<ul style="list-style-type: none"> - The target group (students) - Stories providers like internet providers who are reliable.
<ul style="list-style-type: none"> - ICT infrastructure - STEM-agriculture curriculum 	<ul style="list-style-type: none"> - Courses in STEM pedagogies - Use of a lot of practical activities so that the teachers do the same when they graduate 	<ul style="list-style-type: none"> - Capacity building in the staff that will handle the STEM program - STEM laboratory 	<ul style="list-style-type: none"> - Need to clearly define the students to go through the STEM programme.
<ul style="list-style-type: none"> 1- Content 2- Understanding of the local environment & customs 	<p>An understanding of the STEM methodology and that local culture and environment are key to</p>	<p>ICTs Printed materials</p>	

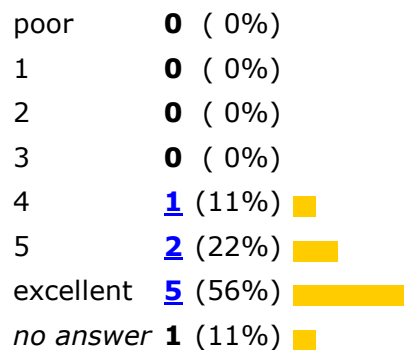
1. What resources, courses and experiences are needed to better prepare teachers in place-based STEM education?	2. What is needed for agriculture and science teachers to improve their pedagogy in STEM subjects?	3. What resources, skills and infrastructure is needed to implement technology and distance learning for a Certificate Program in STEM education?	4. What other issues need to be addressed?
3- Use of local material	delivery of science knowledge.		
Resources: - Skilled teacher educators - ICT courses - ICT equipment	Continued professional development activities that will integrate STEM pedagogies.	- Lecture rooms - ICT equipment & infrastructure - Skilled lecturers	To decide diploma/certificate or degree programme? ODL or blended?
- Financial resources - Human resources - ICT equipment - STEM methodologies - ICT skills - Education Foundation courses - Content in sciences (such as chemistry, physics, biology, math, and agriculture).	- Knowledge on STEM methods - ICT skills - The 5-Es - Have tablets, mobile phones, computers	- ICT skills - Writing skills - Communication skills - Laboratories - Classrooms	- Target group - Duration of programme - Mode of delivery - Political will from government
- Financial resources, human resources, ICT equipment, learners, land - Courses in applied sciences, agriculture, biology, mathematics - STEM education skills, ICT skill & experience	- Have enough resources for implementation (e.g. computers, laboratories) - Support from ministry of Education and other stakeholders - Teacher students who are ready to learn.	- ICT equipment, libraries, laboratories' - Well qualified teachers (Human Resources) - Cluster centers	- Awareness so that people should be aware that ODL is as equal as residential.
- ICT Technologies and textbooks would be helpful - Science and sustainable agriculture courses would be helpful	- To be trained in STEM - To be trained in place-based - To use local resources	- ICT & stationary libraries and laboratories - ICT Skills	- The incorporation of students in STEM.

Malawi Final Evaluation

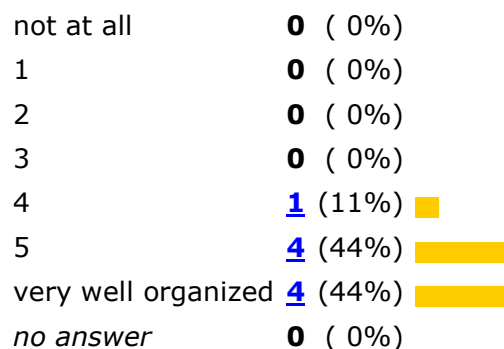
Final Workshop Evaluation
Malawi STEM Education Workshop
LUANAR/InnovATE
September 28-30 2015 Lilongwe, Malawi

On a scale of 1 to 5, please rate the following questions by selecting the number that comes closest to your evaluation.

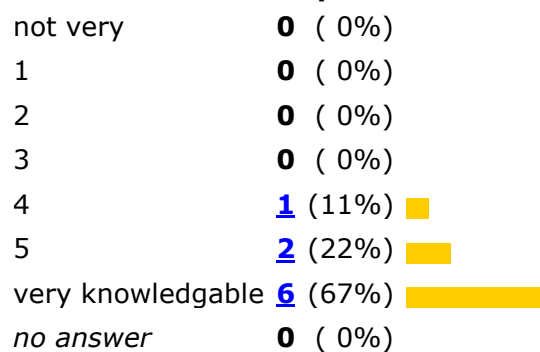
1. Please rate how well this workshop met the objectives.






2. Was the workshop well organized?






3. Were the workshop facilitators knowledgeable?






4. Were the workshop sessions helpful?

not very	0 (0%)	
1	0 (0%)	
2	0 (0%)	
3	0 (0%)	
4	1 (11%)	
5	3 (33%)	
very helpful	5 (56%)	
no answer	0 (0%)	

5. Has this workshop increased your understanding of how to improve student learning in science and agricultural education?

not at all	0 (0%)	
1	0 (0%)	
2	0 (0%)	
3	0 (0%)	
4	2 (22%)	
5	4 (44%)	
to a great extent	3 (33%)	
no answer	0 (0%)	

6. How applicable is place based STEM education to science and agricultural education in Malawi?

not at all	0 (0%)	
1	0 (0%)	
2	0 (0%)	
3	0 (0%)	
4	1 (11%)	
5	5 (56%)	
to a great extent	3 (33%)	
no answer	0 (0%)	

Appendix 5 - UPIC Final Evaluation

Graduates from the UPIC Project 2001-2006

Name	Degree(s) obtained	Current or last position
Denis Khasu	MAED/Ph.D.	Snr. Lecturer, Domasi College of Education
Flemings Mgemzulu	MAED	Lecturer, Lilongwe TTC
James Sitima	MAED	Lecturer, LUANAR University
Matthews Mkandawire	MAED	Lecturer, LUANAR University
Odala Banda	MAED	Consultant with RTI in Malawi
Ebiudi Kapalamula	MAED	deceased
Stella Kamwendo	MAED	Blantyre Polytechnic/University of Malawi
Elizabeth Meke	MAED/Ph.D.	University of Malawi- Chancellor College
Maxwell Magalasi	MAED	Deputy Principal, Machinga Teachers College
Ibrahim Nthalika	MAED	Consultant – Action AID
Rogers Chandidya	MAED	deceased
Misheck Munthali	MAED	Lecture, Domasi College
Absalom Phiri	MAED/PhD	deceased
Olive Nampanda	MAED	Lecturer, Catholic Univ. at Montfort
Mathias January	MAED	Lecturer, Domasi College of Education
Christopher Kananji	MAED	Malawi National Examination Board (Ministry of Educ.)
Tasokwa Musa-Kakota	MAED/Ph.D.	Lecturer, LUANAR University
Christopher Mpewe	MAED	Lecturer at Mzuzu University
Symon Chiziwa	MAED/PhD	Lecturer, Chancellor College
Anderson Chawala	MAED	Lecturer, Domasi College
Esther Msowoya	MAED	Snr. Consultant Guidance and Counseling-Youth Dev. Center for Africa
Alois Muhuta	MAED	deceased
Gift Nkunika	MAED	World Vision (NGO)
Ndalapa Mhango	MAED/Ph.D.	Head of Department, Malawi Assemblies of God University (Formerly Coordinator of Online Distance Learning (ODL) for the SADC region.

William Susuwele-Banda	Ph.D.	Director, Malawi Institute of Education
Manuel Kazembe	Ph.D.	Snr. Ed. Officer, Mphemba Staff Development Institute, Blantyre
Edith Mmela	Ph.D.	Snr. Lecturer, Domasi College of Education
Clemence Kadzera	Ph.D.	Retired, Domasi College of Education
Hasten Mjoni Mwale	Ph.D.	Retired, Domasi College of Education
Wotchiwe Kalande	Ph.D.	Snr. Domasi College of Education
Jervason Kanyangambala	MAED	Deceased
Mapopa Sanga	MAED/PhD	Assistant Professor, Oklahoma State University
Simeon Gwayi	MAED/PhD	Dean, Faculty of Education, Mzuzu University
Nertha Nyoronggo	MAED/PhD	University of Malawi
Laura Malala	MAED	Public Librarian
Paxton Zozie	MAED	Mzuzu University, Snr. Information Officer

IMPACT and SUMMARY of the UPIC PROJECT for MALAWI (2001-2006)

The list above shows the names of our graduates from the UPIC Project funded by USAID in Malawi. The objective of the project was to establish a 4-year degree program for teacher educators for the primary teacher training colleges. Two Phases:

Phase I Results: (a) 6 Doctoral students graduated; (b) 24 Masters Teacher Educators graduated (c) 5 Masters in Instructional Technology (Mzuzu University). All together in Phase I, 35 completed their degree requirement at VA Tech and were all deployed in Malawi in the education sector.

Phase II The establishment of the 4-year Primary Teacher Education degree program at Domasi College was made. The graduates from the UPIC project became Instructors to start the Phase 2 of the B.Ed program. As of today, 8 cohorts or 350-400 have graduated at Domasi College with a degree specializing in pedagogy for the Primary Teacher Education and were deployed in the 6 Teacher Training Colleges (TTCs) and other sectors of the education system. Many of the B.Ed graduates are tutors at the TTCs and others have joined NGOs or the Ministry of Education across the country. Nine of the UPIC masters students have upgraded themselves to the PhD levels and are taking leadership positions in the Malawi Education system and in higher education.

From all intents and purposes, the UPIC project was a very successful venture. Apart from the 5 who are deceased (3 by accidents, and 2 natural causes), only one is employed outside Malawi, otherwise, the rest are all in Malawi holding leadership positions of responsibility. It is clear that the impact of providing a strong foundation in the primary education level will improve their performance level as they go to high school (Need for tracer studies are essential).