

International Research Experiences for Students and Place-Based Learning: Studying Faults in the Malawi Rift



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INTRODUCTION

Field experiences are a fundamental and common component to geology studies and can teach students practical field methods, primary data collection, and research skills (Petcovic, Stokes, and Caulkins, 2014; Pyle, 2009). The literature indicates that research experiences support undergraduate students' career decisions across STEM disciplines (Lopatto, 2017) and can help develop the professional identity of STEM students (Graham et al, 2013).

This international experience provided students an opportunity to conduct authentic research for one month in Malawi. Prior to the trip, students completed a semester long course where they studied the geology of Malawi and completed mini projects on the study site. In addition to receiving training on geophysical and structural geology field techniques. In the field, students applied these techniques to study new faults forming by continental rifting and that produced damaging earthquakes. Further, students received training on international travel and some culture training.

Purpose

The purpose of this research study was to understand participants' perceptions of what they gained from participating in an extended, international field experience. As such, the overarching research question this study addresses is:

- What do students perceive as the value of an extended international research field experience?

Participants

 <p>Location</p> <ul style="list-style-type: none"> • Texas – 4 • Oklahoma – 4 • Puerto Rico – 2 • North Carolina – 1 • Canada – 1 	 <p>Ethnicities</p> <ul style="list-style-type: none"> • White – 8 • Latino – 3 • White/Native American – 1 • Black – 1 	 <p>Classification</p> <ul style="list-style-type: none"> • Undergraduate – 11 • 1 non-traditional veteran • Graduate – 2
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METHODS

Participants completed semi-structured interviews prior to and after completion of the extended field trip. Interviews were audio recorded and transcribed. The present findings are limited to the post-interview transcripts. Researchers used descriptive coding (Miles, Huberman, and Saldaña, 2014) to analyze the transcripts. Findings are reported in aggregate to protect confidentiality of participants.

RESULTS

Qualitative Analysis Themes

Cognitive Dimension (Knowledge and Skills)	Use of Equipment
	Field Observations
	Quasi-Independent Research
Affective Dimension (emotional and attitudinal)	Cultural Awareness
	Appreciation for Home
	Professional Identity

Cognitive Dimension Quote Examples

- **Use of Equipment**
 - I'm really confident with resistivity. I could get out there and run a team by myself on resistivity and feel really good about it. (FU2-1)
 - I learned how to use a lot of tools, I feel more confident in interpreting geological data now. (FU1-2)
- **Field Observations**
 - we found an unconformity and then I guess the boys found a different one on a different day. Everybody was pretty excited about that. To like see that, actually – in an outcrop. It's not something really any of us – at least the students – we hadn't really experienced before...was seeing something...I mean, we had seen one or two I think in field camp, but this was like we knew where they were and they were pointed out to us but like discovering them on our own was really cool. (FU2-1)
- **Quasi-Independent Research**
 - Just the research was a lot of fun. I felt like we did productive stuff. It was cool to be able to do new research that no one has ever done before. (MU1-3)

Affective Dimension Quote Examples

- **Cultural Awareness**
 - It was just a pretty good shock to get there and even being open-minded and going "okay, I know this is going to be very different. I know there are a lot of people that live without running water and things like that." It was still quite a culture shock to really be immersed into that for a whole month. (FU2-1)
 - I think I also did gain an appreciation for what I have and things here and how big the world is. It is one thing to see on National Geographic or watch YouTube videos or pull up the CIA world fact book, but it's another thing to go there and live there for a month and see the way people live. It really makes you appreciate what you have and it also kind of gives you an appreciation, understanding maybe of how people who aren't white feel in the country. Because it was us, we were the only white people in these huge cities. We stick out like a sore thumb. In our dress, skin color and all that. You know it kind of makes you conscious of it and it kind of makes you realize that this is what some people feel like here. It is very different here, versus over there. We were really the other. (MU1-3)
- **Appreciation for Home**
 - ...we have lights every night, we have water, we have food, you know you can go to a restaurant and not eat your entire plate of chicken and then they will just go throw it away in a trashcan. When these kids in Africa don't get chicken every night, they get like crackers or something. So, it was a very humbling experience, um I grew a lot I feel like my perspective is a lot more open so, yah, it was incredible. (FU1-2)
- **Professional Identity**
 - it kind of opened up different fields to be interested in. I really love structural geology. I really like interpreting like taking small scale data and a larger tectonic scale...it just solidified my interest in structural geology and physics. (FU1-2)

Tell me about your experience...



Building Global Community



UPRM student interacts with Malawi children during a rest from fieldwork.

Global Mentoring



UPRM student, teaches Malawi student how to use the Brunton compass.

Learning about the Land



OSU students collect structural orientation data

CONCLUSION

Findings from this study indicate that students found positive values in participating in this extended international field experience to Malawi. Our findings support others in that these field experiences had both cognitive and affective benefits for the students (Petcovic, Stokes, and Caulkins, 2014). Malawi provided a unique opportunity for students to conduct authentic and original geological research in a new mapping area. Students gained more global cultural awareness by being immersed in a culture other than their own. Further, this experience provided students an opportunity to develop their professional identity as geoscientists

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