

## **Experiential learning: Assessing value of three summer field course approaches**

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### **Abstract**

The University of Colorado Denver science education program utilizes numerous national and international field locations as living classrooms. These experiences are academic in nature and incorporate inquiry and research components. This paper evaluates how a series of activities and experiences within three different field courses impact a group of teachers' content understanding and professional self-efficacy resulting in improved classroom practice. The methods used in these experiences include a combination of implicit, informal and formal activities. A combination of experiences and materials has resulted in enhanced content learning and increased professional efficacy for the participant teachers.

Key Words: Experiential Learning, Teacher Preparation, Professional Identity, Cohorts



## Introduction

Experiential learning is a process through which a learner constructs knowledge, skill, and value directly from an experience within the environment. In many respects it is not unlike situated learning or place-based learning. Content learning within these environments occurs when carefully chosen experiences are supported by reflection, critical analysis, and synthesis. Experiences are structured to require the learner to take initiative, make decisions, and to be accountable for the results. The results of the learning are personal and self constructed preparing for and leading to future experiences and learning. Understandings are developed and deepened. Shared experiences within a group or cohort influence this learning. Lave and Wenger (1991) suggest that individuals learn as they participate by interacting with a community, its history, assumptions and cultural values, rules, and patterns of relationship; the tools at hand, including objects, technology, language and images; the moment's activity, its purposes, norms, the practical challenges. Shared knowledge emerges from the interaction of these elements. Activities that involve professionals in open and dynamic discussion, mutual problem solving and/or collaborative learning draw the participants into a community of learners or professional cohort and contribute to a deeper understanding of the science concepts and content expressed during the experience. The increased content understanding enhances the professional efficacy of the participant resulting in more confident practice.

The use of a field site considers this theoretical base in planning meaningful activities. The field experience is designed to meet all of following program objectives.

- A) Increased knowledge of science content and concepts
- B) Create understandings of the connections and relationships within the selected environment
- C) Skill development in doing science inquiry utilizing the field site resources
- D) Support for implementation of critical thinking and problem solving skills.
- E) Enhance sense of professional self-efficacy

## Research Project Specifics

The three field studies involved in this research were designed using the above theoretical base. Each however had one different major component relating to content delivery during the experience. The three field studies were all led by the same professor and in the same summer semester.

- A. Kilimanjaro Trek and Safari: professional movie made of the experience requiring scripted lectures and activities involving the participating teachers
- B. Hawaii Volcanoes: scheduled activities, formal/informal discussions, participants issued complete travel format, directions and content support documents, no formal group activity
- C. Rafting Grand Canyon: all informal discussions with support content packet received prior to trip, no formal group activity

Participants were a range of K-12 teachers, prior content expertise varied and prior professional contact with the instructor also varied. Some members of the groups knew each other some were traveling alone.

## Research Methods

The objective of this research study is to describe and interpret the impact of different field study approaches of content delivery on participating teachers and to determine the relative importance of these aspects on their content understanding. The field studies were intentionally structured to provide opportunities for close professional collaboration, social networking and individual reflection. Data was collected from participants prior to and following participation in the field studies. In particular we were interested in discovering if the environment created within the field experience sets the stage for interactions that promote increased efficacy and professional identity as a result of increased content understanding. Each participant was interviewed prior to the field study relating to content understanding, trip expectations and concerns. Post surveys reviewed the pre survey questions and answers. Also each participant maintained a journal throughout the experience. Journal prompts were used.

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### Journal Prompts

Keep a daily log about your experiences (questions, anticipation, events, feelings, learning's...). This can be as long or short as is appropriate for you, depending on the day.

Other specific prompts:

What challenges have you faced?  
 What successes have you had?  
 What unexpected events have unfolded?

What science have you learned or want to learn more about as a result of this trip?  
 What do you want to remember to share with your students and/or colleagues?

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A third method of data collection was evaluation of products developed by participants for both content gain and professional self-efficacy. These involved digital stories, podcast, photo journals, web pages, curriculums and other such products.

In evaluating the journals and digital stories for impacts on professional self-efficacy a method of evaluation was developed. The first step was to determine what themes relating to teacher self efficacy development were present in the data sources. Drawing from a constant comparative approach, data sources were coded sequentially, using emerging codes (with an eye toward indicators of professional efficacy) arising from open coding. As each new data source was examined, new codes were added to the master code list. This method was used to develop five significant codes matching teacher comments derived from a number of sources.

- Sense of connection with the science teaching profession
- Sense of connection to people
- Sense of content learning during the field experience
- Value of significant experience in the course
- Personal significance of the overall experience

An analysis of the coded statements utilized a framework using the three levels of reflection identified by Surbeck, Han, and Moyer (1991): (a) reacting – commenting on

feelings towards the learning experience, such as reacting with a personal concern about an event; (b) elaborating – comparing reactions with other experiences, such as referring to a general principle, a theory, or a moral or philosophical position; and (c) contemplating - focusing on constructive personal insights or on problems or difficulties. Occurrences of codes were tabulated and combined from artifacts of each individual through axial coding.

To assign a level or degree of reflection to individual thoughts or chains of thought from the artifacts, each coded entry was situated within the reflection framework. Occurrences of reflection levels were tabulated and normed as a percentage of total entries for each artifact. Then, to determine which elements of professional identity were reflected upon most deeply, themes derived from the first process were grouped according to their occurrences at the three reflection levels. Codes falling into level 2 or 3 indicated a level of reflection considered to be impacting their professional identity.

Finally a method of field (content) performance assessment was developed allowing the participants opportunities to demonstrate understanding through field interpretation, group discussion and on-site activities. Data is organized in three columns to aid in reader understanding.

**Initial Observations**

**Kilimanjaro Experience: scripted lectures and activities**

**Coded Data Observations**

Codes	Framework Match	Examples of statements- level 1,2 and 3
Sense of connection with the science teaching profession	14% were at level 1	“During my teacher prep I didn’t take much science so have not taught much in my 3 <sup>rd</sup> grade class. Now I’m excited to get back and learn and teach more science”
127 total statements	38% were at level 2	“I’ve taken a lot of biology coursework but I’ve learned more in this course than most.”
	48% were at level 3	“I’m really glad I did this, my students will view me differently when I incorporate my experiences into my lessons. Makes me look more like the scientist I want to be.”
Sense of connection to individuals	10% at level 1	“The orphanages were sad to see, so many children but they seemed happy”
88 total statements	46% at level 2	“The science was great but the people were what impacted me the most. I’m pretty naive about different cultures and I guess I’ll have to rethink some notions”

	44% at level 3	“When I get back, I plan on setting up a program in my school to connect our students with one of the orphanages”
Sense of content learning during the field experience	26% at level 1	“Everything was incredible but what I learned about animals was amazing, I’ll never teach biology the same”
78 total statements	58% at level 2	“The animals were amazing, nothing like what I expected and different than I expected in how they lived together. How they adapt to the environment is what I’m interested in”
	16% at level 3	“I have this idea about how to use the photos of all the different ecosystems in my ecology unit. It’s bound to engage my student more”
Value of the movie making during the course	12% at level 1	“This was a life changing event for me”
90 total statements	22% at level 2	“ I hope being in this movie will help other teacher be able to participate in similar type experiences. I’m so proud to have been part of it.”
	66% at level 3	“I was worried about being in the movie, looking stupid but now I very excited to see the final product. My students are just as excited, calling me a rock star. I feel proud to be a teacher and work with the students I have in front of me.”
Personal significance of the overall experience	12% at level 1	“When I heard about this class I thought it sounded very scary. Then I thought I needed to do it and not be afraid. Turned out to be hard but I did it and am very proud. It will be hard to justify being scared to do something in the future”
144 total statements	25% at level 2	“I learned so much on this trip that it will take me a year to process it all”
	63% at level 3	“I’ve got some great stories to enrich my lessons. I need to do this type of thing more. I can’t wait to teacher this fall”

**Hawaii Volcano Experience: scheduled activities, formal/informal discussions**

**Coded Data Observations**

Codes	Framework Match	Examples of statements
Sense of connection with the profession  107 total statements	23% were at level 1	“It sounds rather elementary, but I’ve never bothered to look up the word botanical to determine it’s meaning. Today I’ve seen the meaning.”
	56% were at level 2	“I’m just an elementary teacher and don’t know much science but want to know more after this trip.”
	21% were at level 3	“I want to do more experiential learning with my students, it works for me and I think will work for them.”
Sense of connection to individuals  91 total statements	64% at level 1	“There was lots of diversity everywhere we went but I felt comfortable all the time.”
	20% at level 2	“I have made lots of friends in this group, I hope to continue contact. They are all such good, dedicated teacher.”
	16% at level 3	“I like being a teacher and being around teachers. They are interesting and fun. A number in this group appear to be fine teachers and I hope to work with them in the future.”
Sense of content learning during the field experience  98 total statements	9% at level 1	“...was sad to leave the volcano, but each day on Kona side was very cool, recognized the impacts of earlier eruptions and was pleased that no one had to tell me”
	49% at level 2	“The trees in the Kokee swamp were wonderful, lush, decomposing, competing for space. They were surprisingly void of animal life on the trail.”
	42% at level 3	“The change in the old lava in the Koholas was amazing. I could see the breakdown into clay and sand, saw the connections, first time

I even thought about geological change”

Value of participating in the course	12% at level 1	“I understand things today that I wasn’t even aware of yesterday”
154 total statements	50% at level 2	“I could have read the information we learned today and not known any more than when I started. But seeing it first hand accompanied with expert narration is the only way to learn it. Now the trick will be to recreate my learning experience. I think vocabulary is key to students being able to speak intelligently and internalize their understanding. There is plenty of vocabulary to go thought today, Caldera, lava lake, fault scarp, fault blocks, pahoehoe, lava tubes, viscosity, cinder cone, lava flow, lava field, Pele, Pele’s tears and hair and Aa lava.”
	38% at level 3	“It’s really amazing to think that two days ago about all I knew about volcanoes was a few words and their physical makeup. Now I can identify types of lavas, lava formations, causes of differences in lava, and some analysis of what happened at a lava field. I can’t wait to put my pictures together and share them with my kids”
Personal significance of the overall experience	11% at level 1	“I’m an elementary teacher, almost didn’t come after the pre trip meeting because I was sure I would be lost and confused by the content and didn’t like that possibility- being embarrassed or bored. Now I’m glad I did”
123 total statements	67% at level 2	“... before volcanoes were just definitions but now I’m feeling very different about them. I want to come back and understand more”
	22% at level 3	“Seeing the lava coming down the mountain and flowing into the ocean at night was the most exciting thing I have even seen. Didn’t expect that”

**Rafting Grand Canyon Experience: all informal discussions**

**Coded Data Observations**

Codes	Framework Match	Examples of statements
Sense of connection with the profession	33% were at level 1	“...and I like teaching, its what I do, its what I am.”
97 total statements	46% were at level 2	“I think if I do more of this I’ll be a better science teacher. I feel I learn better this way.”
	21% were at level 3	“These type of things make me remember why I became a science teacher. I love doing science. I have to realize this when planning activities for my students.”
Sense of connection to individuals	62% at level 1	“Being on a raft all day with someone sure helps to get to know them.”
111 total statements	18% at level 2	“I hope to be as good a teacher by the time I’ve taught as long as .....
	20% at level 3	“I was interested in the fact that some teachers in the group have done a number of trips with xxx. I want to do more and hope to be part of this group in the future.”
Sense of content learning during the field experience	25% at level 1	“What a way to learn geology!”
	39% at level 2	“The complexity of the Grand Canyon is beginning to sink in. Analysis of the canyon is detailed and multi faceted.”
74 total statements	36% at level 3	“I never looked at sedimentary rock as being connected to ancient environments and that they can be interpreted.”
	14% at level 1	“This is one of the top trips I have taken.”
Value of participating in the course	62% at level 2	“I’ve learned more on this trip than any class I’ve taken in geology.”
	24% at level 3	“I’ve always though that experiential learning worked with kids, that’s been reinforced. I hope to put more into my course. My principal will need to be convinced but I will push until it happens.”
Personal significance of	12% at level 1	“I’ve never camped. Once in backyard. I



the overall experience

128 total statements

thought that would be a problem but wasn't. I'm more sure I'll do things like this in future"

65% at level 2

"This trip stretched me! I don't know anything about geology and frankly thought that part would be boring, but it wasn't and I know I'll want to learn more. I see things differently, almost like adding Technicolor to the world around me"

23% at level 3

"On the second night I wondered why I had done this trip. I was wet all day, cold most of the time and the science being discussed was beyond me. 6 more days ugh! But that changed. I decided I better make the best of it. Things got better and I'm proud and happy that I did this trip. I learned a lot of science and a lot about myself"

## Conclusions

Data showed positive value for all three trips. The Kilimanjaro course, which had a specific content lecture approach showed the lowest level of content gain with 74% of the comments found in the 2-3 score. The Hawaii course with a mixture of formal and informal content delivery supported by a content manual had the highest content gain scores with 91% of the comments found in the 2-3 score. The Grand Canyon rafting trip with all informal content discussion supported by content packets had a content gain score with 75% of the comments found in the 2-3 score. With all three exhibiting high gain percentages there is no distinction between the Kilimanjaro and Grand Canyon approaches. The Hawaii approach appears to support deeper and more complex reflection on the content. Future analysis of the teacher's presentation of the content in their classrooms will clarify. Self-efficacy gains were high with all three courses.

It is our contention that these heightened perceptions of efficacy and professional identity may lead to an engagement in behaviors and future learning communities that ultimately promote teacher effectiveness. Participants in all three courses had pre-participation expectancies of building social networks and expanding content knowledge. If these expectancies were realized and positively reinforced through the experience of the course activity then we theorize that the reinforcement value of the course activities will be increased from a like-wise growth in efficacy and professional identity. Concurrently, we expect that participation in the course activities will yield movement toward an internal locus of control whereby teachers realize they can positively influence their educational environments and more positively impact their students.

## References

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