Assessing the Efficacy of a Role-Playing Activity in a Post-Secondary Geoscience Course

UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
Department of Geoscience

Jennifer Cuthbertson and Claire Paton, University of Calgary

Based on: https://serc.carleton.edu/introgeo/roleplaying/examples/slmtscen.html

Original Author: Janice Cooper

Posted online with the permission of Glenn Jaecks (University of California Davis Geology Department)

Class Demographic

Third year igneous petrology class at the University of Calgary, Alberta. 40 students. Each role included 2-3 students. The role-playing activity took one 50-minute class.

Expectations for Role-Playing Activity

1) Read all the required web pages before the date of the role-playing activity.
2) Come prepared to contribute to the discussion from your character's point of view.
3) Sign the sign-in sheet when you come to class for the role-playing activity.
4) Make at least 1 meaningful contribution to the class discussion during the activity.
5) Have fun!

The information in the required readings is testable for the Lecture Midterm Exam. The role-playing activity is worth 2% of your course grade.

Scenario

You were born and raised in a little mountain community on the east slope of the Sierra Nevada in California. This town stayed small because economic opportunities were sparse once the Gold Rush was over. For years, you and your neighbors have scraped along by selling a few Christmas trees in winter and driving logging trucks in summer.

However, when Caltrans improved the State highway system a few years ago and old 395 became a much faster 4-lane, the little town suddenly became accessible from the Los Angeles area, at least for a weekend trip. And just as suddenly, all the snow and steep terrain that had been such a nuisance to daily life for years began to look like money: ski money!

Some of your neighbors have gone into partnership to finance the construction of ski lifts and renovate some old barns to make instant traditional ski chalets. Others are planning to get rich on the businesses that spring up around a ski resort: ski-wear shops, bars, restaurants, bars, service stations, bars, and souvenir shops. Real estate investors want to build condos. Others are thinking about summer businesses and plan to open a rollerblade rental and a mountain-bike shop.

The community is attracting new residents for the first time in decades: merchants, sporting goods dealers, construction workers, retirees, teachers, and artists. The value of your property is going up weekly, with no end in sight. You might even be able to replace the ol' pickup next year, or at least get a new gun-rack!

BUT now a group of Government seismologists and volcanologists have surveyed your area, and they have just made a devastating announcement: Mammoth Mountain, the hub of your proposed ski slopes, is a volcano that shows signs of an imminent eruption!

The announcement shocks the entire community. Reactions vary widely. Opinions form quickly and polarize the denizens. Some say "BUILD ANYWAY AND LIVE WITH THE RISK"; others say "SHUT DOWN COMPLETELY AND PREPARE FOR THE WORST".

State officials have called for a Town Meeting to make an inquiry about the commercial development of the area in view of the geologic hazard. All residents are invited to voice their opinions and recommendations at the Town Meeting. What should be done? Build or not build? Who should pay for all the extra expenses associated with feasibility studies, environmental impact reports, etc.?

Learning Goals

Students will:

- **Examine methods used to monitor volcanoes.**
- **Evaluate the risks of volcanic activity in a fictitious setting.**
- **Experience the ways in which volcanoes affect the lives of the people living near them.**

Format for Discussion

This is a Town Meeting about the situation, moderated by the State officials (your Instructor and TA). The officials are here to listen to the views of the people, even though it is not quite clear what the officials will do about the problem. Rumor has it that the officials are very close to the Governor of California, so any action by the State will likely be based on the way the meeting goes.

You will **play the role** of one of these people and will put in your two cents worth at the Town Meeting:

- **Geologist**
- **Geophysicist**
- **Ski Resort Owner**
- **Fire Chief**
- **Big Land Developer**
- **Local Environmentalist**
- **Regional Highway Manager**
- **Unemployed Resident**
- **Ski Bum**
- **Resident with Five Kids**
- **State Official from the Office of Emergency Preparedness**
- **Mayor**
- **Local Congressman**
- **Investigative Reporter from the Local TV Station**

Everyone Must Read the Following Web Pages to Prepare for the Discussion:

Carbon Dioxide Discharge from **Mammoth** Mountain

https://pubs.usgs.gov/dds/dds-81/Intro/MonitoringData/CO2/CO2.html

Invisible CO_2 Gas Killing Trees at Mammoth Mountain, California

https://pubs.usgs.gov/fs/fs172-96/

Disaster Waiting to Happen (San Francisco Chronicle, 2001)

https://www.sfgate.com/news/article/Disaster-waiting-to-happen-Lurking-beneath-the-2886808.php

Mammoth Earthquake Swarm is the Largest in Nearly a Decade (LA Times, 2014)

https://www.latimes.com/local/lanow/la-me-ln-mammoth-earthquake-swarm-largest-in-a-decade-20140926-story.html

USGS Mammoth Mountain Geology and History Site

https://volcanoes.usgs.gov/volcanoes/mammoth_mountain/

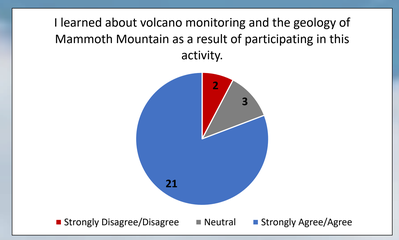
USGS Mammoth Mountain Monitoring Site

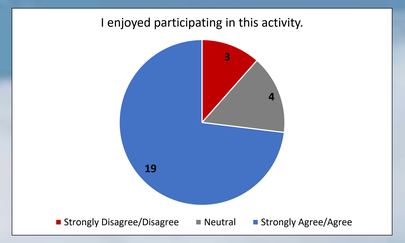
https://volcanoes.usgs.gov/volcanoes/mammoth_mountain/mammoth_mountain_monitoring_8.html

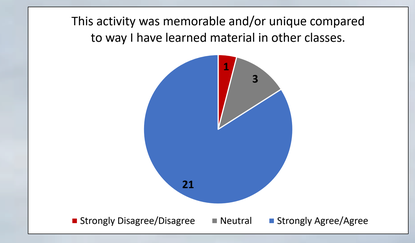
Acknowledgements

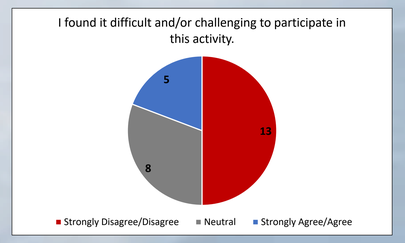
Many thanks to Dr. Jennifer Adams and the other members of the Creativity in STEM Community of Practice at the University of Calgary for their ongoing encouragement and support. Thanks also to teaching assistant Jacob Forshaw, who helped in facilitating the role-playing activity.

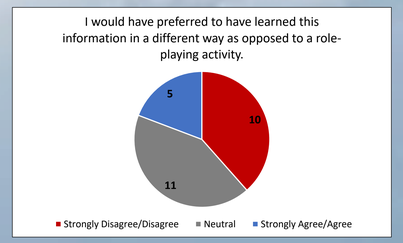
Results of Anonymous Student Survey











If you were the Course Instructor, would you change anything about this activity?

"I, personally, would choose to do an activity like this in lab instead where groups are smaller and the discussions could go further in depth. There were a lot of people trying to get their turns to the point where it was hard to get a word in between people attempting to speak and others that would interrupt and talk over everyone."

"Make the duties of each role more obvious."

"Maybe call on people in a more specific order, it's sometimes difficult to interject, or it doesn't always feel relevant to everyone participating."

"No, the activity is really engaging and a different experience. It was fun and entertaining, it almost had a debate like atmosphere which kept the activity going."

"Not really, I think Jen did a good job in leading the discussion without being too pushy."

"Nothing."

"Not do a role playing activity."

Conclusions

The role-playing scenario "The Sleeping Mountain" was incorporated into a third year igneous petrology class. Results of the post-activity student survey indicate that most of the students felt they learned about the monitoring and geology of Mammoth Mountain, enjoyed participating in the activity, and found the activity memorable. Improvements for next time could be to do the activity in a lab period, and call on students in a specific order.

Credit for background photo: https://www.enjoythemountain.com/mammoth