# Live Episodes and Reruns of Virtual Field Trips

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# Field trips are valued in geology, yet face challenges

- Connect classroom learning to the real world
- Develop content knowledge and transferrable skills
- However, field trips may be physically and mentally demanding
- Limited by logistical, financial and health and safety pressures
- Virtual field trips offer alternative or complementary experiences to traditional field trips that help improve accessibility

# LEARNZ virtual field trip model

- Translate the successful K-12 virtual field trip model developed by LEARNZ to the postsecondary setting
- Built on Universal Design for Learning (UDL) principles

Live

Immersive

Interactive

# Research questions and methods

1. What were students' experiences in the virtual field trip?
2. How did student engagement in the post-virtual field trip workshop compare to previous years?

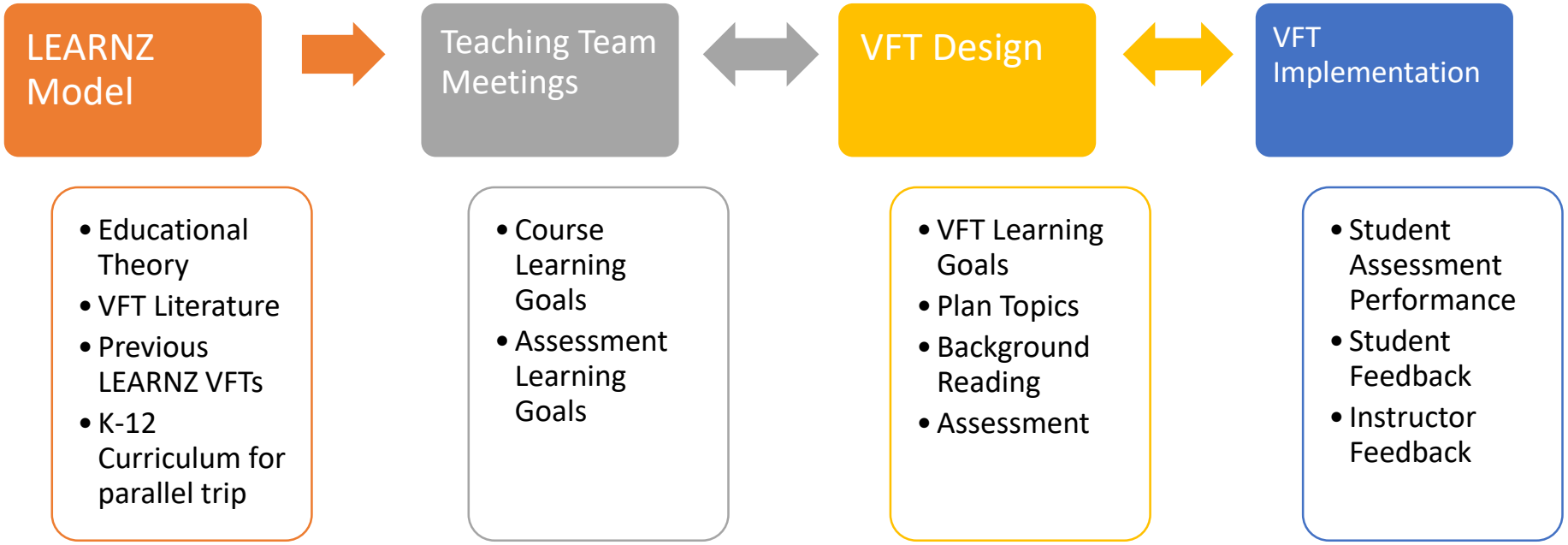
- Answered with Learning Management System usage data, student questionnaires, instructor interviews

# Course setting

- GEOL113: Environmental Geohazards
- Not required for geology majors, but popular option
- Common elective, particularly for engineering majors
- ~100 students/year

| Course Week | Lecture Topics | Practical Components | Assessment |
|---|---|---|---|
| **1** | Geohazards and Society | | |
| **2** | Origins of Earthquakes | | |
| **3** | Measuring Earthquakes | | |
| **4** | Earthquake Hazards | Virtual Field Trip – Week Long | Quizzes (Formative) |
| **5** | Geohazards Case Studies | Workshop – One Day | Report (30%) |
| **6** | Volcanic Hazards 1 | | |
| **7** | Volcanic Hazards 2 | Field Trip – One Day | Report (30%) |
| **8** | Managing Volcanic Disasters | | |
| **9** | Coastal Hazards | | |
| **10** | Landslide Hazards | | |
| **11** | Flood Hazards | | |
| **12** | Current Geohazard Issues | | Final Exam (40%) |

# Design process



# Topics and learning goals

| Topics | Learning Goals |
|---|---|
| **Geohazards** | Identify major geohazards and cascading multihazards in New Zealand, with special attention to the West Coast and Franz Josef. |
| **Seismicity of the Alpine Fault** | Use the paleo-seismic record to interpret how often the Alpine Fault ruptures and from this, estimate the likelihood of a future earthquake. |
| **Earthquakes in New Zealand** | Estimate the length of the Alpine fault and deduce the likely magnitude of the earthquake and its shaking intensity at Franz Josef. |
| **Earthquake Impacts on the Natural Environment** | Identify features in the landscape that result from earthquake shaking and can contribute to river aggradation and flooding. |
| **Earthquake Impacts on the Built Environment** | What will be the likely impacts of an Alpine fault earthquake and its consequential hazards on assets and lifelines (e.g. communications, transport, energy supply, water supply, services) on the West Coast? How long will these impacts last? |
| **Hazard Management and Mitigation** | What resources will be needed to respond to the earthquake and its impacts? What can be done in advance to reduce these impacts? |

# Filming plan

| Lecture Time | Filming Times | Locations | Content Topics | Additional Materials |
|---|---|---|---|---|
| **Tuesday 9th (class at 2pm)** | Sunday 7th – Monday 8th | Various stops on drive to West Coast via Arthur's Pass | Geohazards, Seismicity of the Alpine Fault | Tectonics of NZ figure, map of Alpine Fault, example of multihazard (relating to past rupture), average interval of Alpine Fault rupture figure, map of past rupture events |
| **Key messages: Distinction between geohazards and multihazards. Earthquake effects not limited to the shaking we feel, they are often followed by landslides, flooding, etc. How to use the seismic record of the Alpine Fault to interpret recurrence interval and probability of occurrence.** | | | | |
| **Wednesday 10th (class at 5pm)** | Monday 8th – Tuesday 9th | Previous rupture site (Gaunt Creek), landslide deposit (Poerua Valley) | Earthquakes in NZ, Earthquake Impacts on the Natural Environment | Examples of geomorphic consequences, length and magnitude figure, photos of recent flooding, photos of landslide deposits |
| **Key messages: Magnitude of shaking along and surrounding the Alpine Fault (especially in the case of a future rupture). Evidence of past flooding and cascading hazards.** | | | | |
| **Friday 12th (class at 4pm)** | Wednesday 10th – Thursday 11th | Franz Josef overlook and township | Earthquake Impacts on the Built Environment, Hazard Management and Mitigation | Infrastructure maps (highways, train lines, power lines, etc.), photos of national/international aid, UC Geological Sciences Department's emergency materials |
| **Key messages: Infrastructure (Arthur's Pass, highways, power lines, etc.). Critical industries (dairy farming, mining, tourism) as a lead in to the workshop. Focus on people.** | | | | |

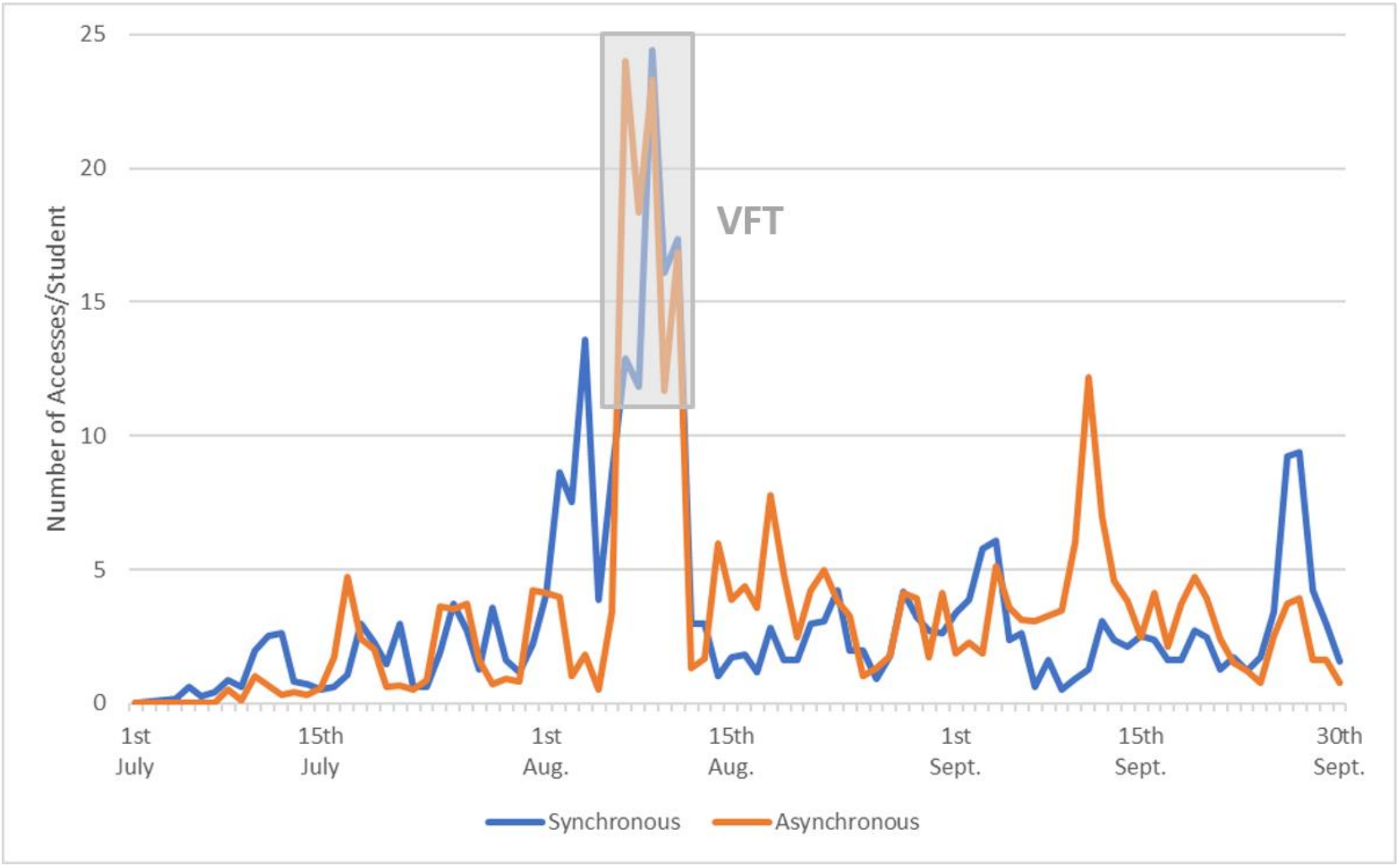
# Live episodes

- 2016: videos filmed during the same week that students participated in virtual field trip
  - Student guide
  - Live A/V conference at the end of the week
- Live implementation came with some challenges:
  - Time constrained
  - Costly to run
  - Instructor frustration over logistics and pressures of working the framework into their course
  - Technical difficulties with A/V conference

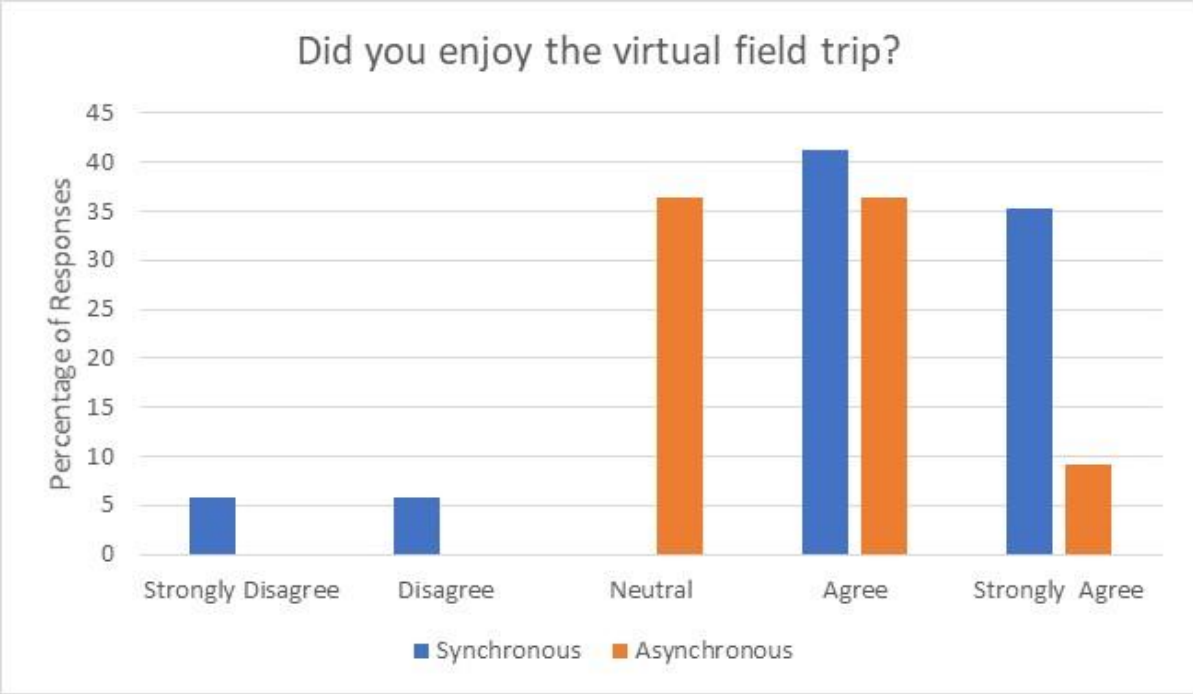
# Reruns

- 2017: videos from 2016 reused at same pace
  - Instructor guide
  - Google Earth component
- Save costs and decrease technical difficulties

# Results: learning management system usage

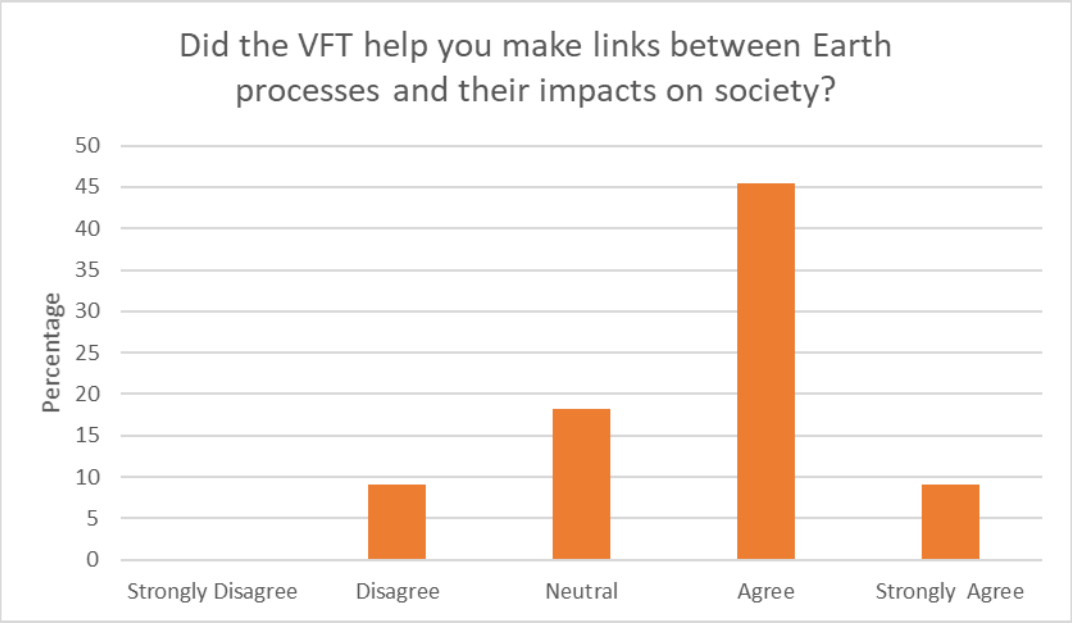


# Results: student perceptions




- *"Was interesting getting to learn about a place through seeing it. Something different than your average lecture."* (Synchronous)
- *"It was good field prep before our actual fieldtrip and gave us a look into what fieldtrip[s] at higher levels will be like."* (Asynchronous)

# Results: student perceptions




- *"Started to think about the geohazards and relevance. Made it easier and less stressful when coming to write the report."* (Asynchronous)

# Results: instructor interviews

- Perceived higher levels of attendance and engagement in the post-virtual field trip workshop than previously
- No discernable difference in skills or knowledge
- TAs reported they were able to spend more time on complexities of earthquake scenario presented, i.e., emergency management
  - Less time needed to explain natural/built environments related to the scenario
  - Students already connected to the reality
- Rerun instructor felt his lecture time was more flexible and students were more engaged during

# Elements of successful virtual field trips

**Constructively Aligned Content**

- Background Readings
- Videos

**Assessment**

- Online Quizzes
- Workshop

**Student Experience**

- Student Guide Diaries
- Instructor Ownership

**Connection to Place**

- A/V Link with Experts
- Google Earth

- Results were interpreted to identify features that made both the live episodes and rerun virtual field trips successful
- Overarching elements were achieved in both versions, but the specifics of student experience and connection to place were changed in the rerun version

# Conclusions

- LEARNZ model for virtual field trips is appropriate and engaging for postsecondary students
- Successfully reused the live episode content in the second iteration of the field trip, without drop in student engagement
- Instructor buy in for the rerun virtual field trip was important in revising and implementing materials

# Future Work

- Continued refinement of the rerun virtual field trip content
  - Enhance sense of community (student contributed video tags, group video watching sessions?)
- Lessons learned from this project are feeding into the development of an Iceland virtual field trip for third year geology course (Magmatic Systems and Volcanology)
  - Parallel K-12 virtual field trip

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