PTAS Project Report (for REGULAR PROJECT GRANTS)

Project Title:
Developing a framework for research-led virtual field trips: Physical and social issues of the natural hazards of Ecuador

Project type (delete as appropriate) :
B Innovation Project (introduction and evaluation of an educational innovation, usually taking a practical approach)

Principal Investigator : Andrew Bell
Schools/department : School of GeoSciences

Team members (including Schools and Departments) : Meredith Corey and Sophie Butcher, School of GeoSciences

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Project teams must submit a report within 4 months of the conclusion of their project.
Copies of dissemination material (eg journals/newsletter articles, conference papers, posters should be listed and attached (separate to the word count). The brief report will be published on the IAD web pages.

Report (maximum 1500 words)

What did you do?

Initial activity in the project involved trialling different types of portable production equipment in the UK, and planning a series of site visits and interviews. The project team then undertook a trip to Ecuador and the Galapagos Islands over the summer of 2018, coinciding with the PI's fieldwork, to record footage to provide the basis of a virtual field trip (VFT) exploring the physical and social science of volcanic and earthquake hazards in the country.

Once back in Edinburgh, the recorded footage was compiled and edited for use in two on-campus courses taught by Bell and Butcher. The aim of the project was to explore the integration of research and teaching and how technology can best support this and allow students the experience of 'visiting' important locations to further their understanding and the implementation of their learning, in this case with regards to real natural hazard challenges. The VFT focuses on the role of the Instituto Geofísico in Ecuador in monitoring, forecasting, analysing, and communicating the natural hazards of the country and how these hazards have affected different communities over time, including several projects Bell and Butcher are currently undertaking in the country. The material is relevant to a range of students from undergraduate to postgraduate taught and research students and can be adapted for different audiences.

In addition to the teaching resource itself, the project has worked to develop a framework for the production of 'research-led' VFTs by evaluating the appropriateness of different filming and production technologies and how to plan and 'write' the content, in order to facilitate the production of future VFTs in new and existing courses. This framework can support researcher-teachers in

creating exciting content for their students by allowing them to share their field research directly with students to enhance learning through research-led teaching.

What did you find out?

Preparing a clear plan for the content of individual recordings and how they contribute to the overall narrative (or narratives) for students in advance is critical to ensure nothing is missed in the field and for efficiently building the VFT once back in the office. For us, it worked best to think about the final VFT teaching resource for the students as being developed from a series of 'building blocks' or small, concise recordings from the field that could then be built into teaching units.

However, as much as you plan the VFT, you also need to be flexible because things don't always go according to plan! While planning the filming, think about how the constituent parts of the VFT could be used elsewhere than your initial course – either in full or as smaller pieces. This is important as it will allow you to use components of the VFT with a wider student (or public) audience over time. The initial plan was for this VFT to be included in a new volcanic hazards course being developed as part of a new MSc programme with the intention to also use parts of it with two existing undergraduate courses. However, the new MSc programme was not developed in the end and so we had to rethink our vision for how the whole VFT could be used within existing courses, rather than just parts of it. In future, it would good to plan several parallel narratives that could be told with the same footage, rather than focusing on one main narrative at the outset, so that it is easier to fit the individual components into a number of different teaching environments to ensure no material goes unused.

Recording and putting together the VFT:

- Having the right pieces of equipment made filming far easier and faster than not – this may seem obvious, but part of the goal of this project was to find the right equipment for this type of setting. We intentionally brought a wide range of equipment with us to test with the goal of being able to suggest a more limited set of equipment for future field filming that would do everything we and others might need. We learned a lot about issues with filming during arduous fieldwork and a wide variety of weather conditions. (There are times where having more than one person doing the filming is helpful, but not absolutely necessary, if you can be creative with DIY rain protection!) Having certain pieces of equipment that could serve multiple purposes is very useful, e.g. a single camera for still images and video with a reversible screen, good microphones (both Bluetooth and camera mounted), good and robust tripod for uneven surfaces.
- Record video at a very high quality. It will get compressed during editing and uploading to the platform for students and it can start to look unprofessional, if the initial file quality was low. (Higher quality videos take up a lot of memory space, so ensure you have plenty of storage!)
- Equipment can struggle in freezing temperatures (battery power is drained quickly) and high altitude (components may jam). Plan accordingly if you're going to be in the field with no access to shops or repairs while filming.
- Good sound quality and short, concise video segments were the most important things we found when back at a computer editing the footage and compiling the content for the VFT. It

is also very helpful to have a lot of additional footage (still images and video panoramas) that can be inserted to provide more information and context.

- No matter how well you plan in advance, you will probably need to create some additional materials to include in the VFT, but this can be easily done back in the office with the filming equipment used in the field or using desktop recorders.
- Include more than just videos and text for the students – add interactive maps, data, mini online activities.
- Look for existing resources that can be included in the VFT – are there videos on YouTube you could use or newspaper articles?

Recording was initially awkward, but became more natural through time. Through what we learned on the trip, it is now doing very easy to do short 'pieces to camera' and include relevant footage from the field.

Have fun with it! You want to create a virtual place that the students want to explore. This is an opportunity to provide a different learning environment and it also gives you the chance to put in things that are related to your field site, but not directly to your research (e.g. local wildlife, food, traditions and stories about the site, the adventure getting to your field site, unexpected conversations with locals, things that go wrong, and other realities of doing field work). These all help create the context and feeling of 'being there' for the students.

Overall, it was a positive experience that benefitted the fieldwork, made us think about the story we were trying to tell to the students through the research and the broader context, with a particular focus on how to integrate complex themes from active research in teaching at all levels.

How did you disseminate your findings?

The VFT material itself has been included in undergraduate teaching in the Natural Hazards (pre-honours) and Natural Hazards and Risk (honours) level courses. We intend to include it in a new MSc programme currently being designed. It has been shared for outreach purposes with research collaborators and via Twitter for general public engagement.

The equipment and VFT development findings have been shared widely within the School, and were used to support the purchase of ~£2500 of filming equipment designed for this specific purpose. The equipment is now part of the School's field equipment catalogue and available to all staff. It has been used to record videos in the field during recent fieldtrip planning visits to support both teaching staffs' understanding of the regional geology and as an introduction for the students of what they will see on the trip. https://www.youtube.com/watch?v=etvPIcLAXbc

We plan to run a face-to-face session with colleagues in GeoSciences to discuss the process and outcomes of the project. We are in the process of recording 'how to' videos to accompany the equipment. We will go on to record videos summarising our findings from the project, incorporating content from future field visits. These videos will support the face-to-face session, but also provide more long-term support for colleagues.

There are a huge number of (often openly licensed) applications and tools to help enhance the delivery of a VFT and add to the interactivity. For example, we are currently developing an interactive timeline of volcanic events in Ecuador to accompany the VFT. We will include our

example of these types of tools in lunchtime drop-in sessions we are planning for staff and students in the School to demonstrate simple, but effective media they can use in their teaching or assessments.

What have been the benefits to student learning?

The Natural Hazards students gave positive feedback about the VFT. It is clear that students engage with and appreciate these 'real world' applications of their learning. The VFT will not be a static resource, but, rather, it will be added to following Bell's future visits to Ecuador to include other parts of the country, updates on research, and additional interviews, so that it always feels up-to-date and relevant to the students and encourages them to think about the application of their learning.

Due to the building block way that we have developed the VFT, the content can be reconfigured to suit a range of student levels and course contexts through some slight changes in the supporting text and accompanying readings. This will allow for a very wide range of students to work with either specific parts of the VFT or the whole resource.

Increasingly, degree programmes in the School have been looking at using a more blended-learning approach and ways to incorporate online teaching materials in on-campus courses. We wanted to demonstrate a range of options for research-educators to allow them to produce high-quality teaching material without having to carry huge amounts of equipment to distant field locations and how they can adapt footage for a range of teaching contexts that allows them to use their research to enhance student learning. The development of the VFT has led us to think about additional ways to incorporate these types of teaching resources – either as full VFTs or smaller-scale projects – in a wider range of courses or as a way to prepare students for in-person field visits they will be undertaking.

How could these benefits be extended to other parts of the university?

All of our experiences and learning in this project could be readily adapted to any discipline or course that could benefit from the inclusion of material from active field work, be it humanities, natural or social science. We hope we have developed something that makes it easier to include active field research for students in any part of the University or for outreach purposes. There a various networking events for learning technologists and teachers interested in using learning technology where the findings could be showcased. Additionally, by creating videos on how to use the equipment and demonstrating some useful online tools, we hope we can provide a context and examples that can be used in conjunction with other training and support provided by other parts of the University (e.g. DIY Film School) to make the creation of VFTs something feasible for academics to do as part of their research and teaching.

Additionally, while the focus of this project was creating a framework to support colleagues in creating VFTs, the more technological side of our findings could be used by students carrying out field work, so that they could create something similar for either their own portfolio or to share with their peers, supervisors, or the public. As mentioned above, the process of developing the VFT benefitted Bell's field work as a researcher, and it would likely benefit the student's learning in their own field visits, too.