



Researching the use of virtual Field trips as a flexible multipurpose teaching resource

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Virtual field trips (VFTs) are a means to give learners a genuine experience and feeling of what it would be like to participate in in-person fieldtrips but can also act as a teaching resource to meet other

learning outcomes that are not necessarily related to fieldwork. These virtual experiences can provide

greater accessibility for people that cannot participate in in-person field trips for reasons such as logistics, cost, or physical ability. Using internet browsers, we have been able to create online content

that is interactive with mapping activities, communication exercises, animations, 360° videos, virtual

rocks, detailed thin sections of rocks, and questions with automated feedback. These VFTs have been

used as more than just a replica of an in-person field trip, they can be used in a variety of contexts. As

an example, our research group has used them as: 1) flexible knowledge resources to replace lectures

and supplement hands-on laboratory classes and tutorials; 2) fieldwork preparation resources that teach content and allow students to explore outcrops they will visit in person; and 3) a self-guided field trip when group field trips are impractical or impossible (e.g., student illness).

We have found that VFTs allow educators to take students to places they would otherwise not be able

to go, to familiarize students with field skills and content before going into the field to maximize learning on in-person field trips. Our research results from student interviews, focus groups and pre-

post measures of learning show that students enjoy and engage well with the digital content, although

we are still far from an immersive in-person field experience. Looking to the future, we are continuing

to develop new ways for students to genuinely explore and discover on a VFT, making use of mixed

reality, which has the potential to provide students with an even more immersive experience. Such interactive VFTs can be suitable replacements for lecture content in a flipped classroom or as preparatory exercises for in-person fieldtrips, but they should only replace in-person fieldtrips after careful consideration.