

Investigating the role of Virtual Reality in science and geography in schools via Google Expeditions

The year 2016 is when Virtual Reality has finally become a mainstream product, with major investment by some of the leading developers in the IT and smartphone sector (e.g. HTC, Samsung, Sony). Whilst the Virtual Reality (VR) devices being launched this year are usually associated with gaming and entertainment, their potential in education is also being explored.

Google Expeditions (GEs) (<https://www.google.co.uk/edu/expeditions/>) is one of the VR approaches being promoted by Google in schools globally. GEs are guided tours (field trips) of places, which students experience on a smartphone through a virtual reality viewer called Google cardboard (<https://www.youtube.com/watch?v=mLYJdZeA9w4>). (Also, see another video: https://www.youtube.com/watch?v=FQ_Whw6oSv4).

A GE comprises 360-degree scenes or panoramas of a location (e.g. a museum, or a city, such as Rio de Janeiro) along with the description of that location, points of interest and some suggested questions for inquiry and discussion. GEs also enable visualisation of locations that may not be feasible or easy to visit in real life (e.g. underwater excursions, or the Great Barrier Reef or Galapagos Islands). Furthermore, GE-like VR-based simulations can help to envision concepts and systems such as the human heart, circulatory system, or a plant cell.

Teachers of Geography and Science trying out Google Expeditions at a local school in Milton Keynes



Using a tablet and via the GEs App (available from Google Play Store), a teacher can guide students to look at places and concepts. Students experience the GE/VR through the smartphones embedded within the VR viewers.

ASE has partnered with The Open University (OU) UK to support a school-based research project (funded by Google) on the potential use of VR via GEs in secondary science and geography. The project is being co-led by the Field Studies Council and, along with ASE, the Geographical Association is also a partnering organisation. The project will run until July 2017 (project website: <http://www.shaileyminocha.info/google-expeditions/>).

The focus of this project is to answer questions such as:

- How can VR-based virtual field trips prepare students for physical fieldwork and support the *pre-field trip* and *post-field trip* activities, as well as enhance the fieldwork experience *during a physical field trip*?
- How effective are VR-based field trips in bringing concepts to life within a classroom, such as showing students a human heart simulation, or taking them on an underwater excursion, or teleporting students to Mars?
- Do VR-based field trips facilitate spatial literacy?

■ Can VR-based field trips via GEs support self-directed inquiry-based learning?

Involvement of UK schools in the 2016 autumn term

We are inviting schools and teachers (Key Stages 3, 4 & 5, ages 11-19) to participate in our research in the following ways:

- in-class sessions with students and teachers, where the OU research team will observe how students and teachers use GE-based VR field trips in a lesson (the research team will help the teacher to plan the lesson ahead of the session(s));
- meeting with a group of science teachers during lunch-hour or at the end of the school day; this will involve a demo and hands-on session and discussion on virtual reality fieldtrips and their role in science curricula; and
- involving teachers in reviewing GE-based virtual field trips with the view to reflecting on the role of VR-based field trips in teaching and learning science.

To express your interest in taking part in this project, please complete this online form: <https://www.surveymonkey.co.uk/r/Virtual-Reality-Google-Expeditions>, or <http://bit.ly/29ShR6k>. Alternatively, please contact Marianne Cutler at ASE (mariannecutler@ase.org.uk) or Dr. Ana-Despina Tudor (ana.tudor@open.ac.uk) or Professor Shailey Minocha (shailey.minocha@open.ac.uk) at the OU.

The research will be carried out with approval from OU's Human Research Ethics Committee. The findings of the project will be shared with teachers and their schools. Ways of recognising participating schools and teachers are currently being investigated.