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Educational Affordances of Mobile Virtual Reality

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31 October 2017
3D virtual environments and virtual reality

Second Life

Virtual Skiddaw: 3D Geology Field Trips (Unity 3D)

360-degree videos in the browser

Virtual reality viewers
‘As if I have met you’

...I get a feeling of meeting you face-to-face...even though I engage with avatars, I am aware that behind them there is a real person...
3D virtual geology field trip – Virtual Skiddaw
360-degree videos in the Chrome browser

VR in brain surgery
https://www.youtube.com/watch?v=1H9qNaP0W9o

Ocean: A 360-degree tour of the mysterious, magical corals of Palau;
The Economist
https://www.youtube.com/watch?v=jvtvFHPRcsY
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Virtual reality viewers

Mobility
Google Expeditions kit and demo

Tablet + Smartphone + Cardboard Viewer + Google Expeditions App + Router
Visiting remote or unsafe locations

- The Great Barrier Reef during a bleaching event
- Borneo Rainforest – mangroves on salty land
- Chernobyl
- International Space Station
Google Expeditions – mobile virtual reality

- Inquiry
- Geography and science education
- Fieldwork education
- Learning through simulations
Empirical research

Lessons in schools
- science (n=14)
- geography (n=10)
- students (n=549)
- year 4 to year 11

Interviews
- science teachers (n=11)
- geography teachers (n=9)
- curriculum experts (n=6)

Workshops
- field workers (n=19)
- educators (n=55)

Class preparation

Inquiry-based learning activity sheet
Affordances

- 360-degree visual authenticity
- Emphasis and in-situ contextual information
- Single-user handling
- 360-degree navigation
- First-person perspective
- Synthesis
- 3D view
- Simulation
- Visualisation
Geographical or scientific inquiry

creating a need to know → questioning → collecting data → making sense of the data → reflecting on learning
Questioning

creating a need to know → questioning → collecting data → making sense of the data → reflecting on learning
Higher-order question:

“Can the colour of the coral before it’s been drained come back?”
(Year 8, Geography, Climate Change and The Great Barrier Reef Expeditions)

Teacher’s comment:

“You’d need to explain why, the fact that it was variable on the coral. It links to the idea of resilience” (Geography teacher)

Higher-order question:

“How did the mangrove leaves adapt to take in the salt?”
(Year 10, Geography, Borneo: Plant Adaptations Expedition)

Teacher’s comment:

“That’s really interesting because they’re asking why now. They know they do, now they want to know how” (Geography teacher)
Virtual reality for fieldwork education

- pre-physical field trip
- during a physical field trip
- post-physical field trip
Pre-physical field trip

“Familiarisation with locations:
Allow students to plan ahead for how long it will take them to access the site and to carry out the physical measurements.”
During a physical field trip

- pre-physical field trip
- during a physical field trip
- post-physical field trip
Global to local

“It helped me to understand the Chilterns is an area of natural beauty compared to some places in the world. It helped me to feel more caring about the Chilterns.”
After a physical field trip

- Pre-physical field trip
- During a physical field trip
- Post-physical field trip
We did go on a little tour of the graveyard to look at how rocks are being used in the churchyard and in the church, so GE is going to be taking you to places where I can’t actually take you because it’s too far and it’s too expensive.
Learning through simulations

“the animation was very realistic; therefore, I could take more knowledge away from the lesson [...] these images can [...] help me explain about the respiratory system in a much larger amount of detail.”
The future
Questions and comments

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http://www.shaileyminocha.info/google-expeditions/; has links to blog-posts

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