Extending science lessons with virtual reality

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Agenda

- What is virtual reality?
- Google Expeditions
- Our research goals
- Group discussion
- Preliminary research outcomes

What is virtual reality?

A simulated environment on a computer or mobile platform (e.g., smartphone, tablet):

- Second Life
- Virtual Skiddaw: 3D Geology Field Trips (Unity 3D)
What is virtual reality?

A simulated environment on a computer or mobile platform (e.g., smartphone, tablet):

- Second Life
- Virtual Skiddaw: 3D Geology Field Trips
- Head-mounted Displays
- Viewers
- Mobility

Google Expeditions

- Tablet + Smartphone + Cardboard Viewer + App
Google Expeditions

- Photospheres (360° view)
- Three-dimensional representation
- Real places or simulations
- First person exploration

Our research goals

- Whether and how virtual reality-based Google Expeditions (GEs) can be integrated in the Science curriculum (classrooms)
- Whether and how virtual reality-based GEs can complement physical field trips
- Whether and how virtual reality can support CPD of teachers
- Recommendations for the user interface design of GEs
Our research goals

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Our research goals

- Whether and how virtual reality-based Google Expeditions (GEs) can be integrated in the Science curriculum (classrooms)
  - Teaching science concepts and phenomena
  - Support inquiry-based learning and students’ curiosity
How you could help us?

- Trying it out today *(Demo)*
- Thoughts on the fit with the curriculum

Group discussion

Think of one of the difficult concepts in Science:

How could Google Expeditions (or Virtual Reality, in general) help you to teach that concept?
Group discussion

How would you use Google Expeditions to encourage inquiry-based learning?

Group discussion

What are the challenges that you would face in integrating Google Expeditions in your curriculum?
Preliminary research outcomes

Inquiry-based learning activities with students

Lesson Example:

• Learning outcome: How solar energy is converted into electricity
• Teaching resource: “El Romero Solar Photovoltaic Plant”
• Student activity: Write down questions related to the learning outcome

We analyse the question type

Low-order questions
“How much does a solar power plant cost?”

High-order questions
“What evidence is there to show that [solar energy] is more efficient than burning fossil fuels?”
Preliminary research outcomes

Google Expeditions in class:

- More questions than in a usual lesson
- More high-order questions
- More engagement from lower ability students

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