3D virtual geology field trips: opportunities and limitations

Conference or Workshop Item

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3D Virtual Geology Field Trip

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Setting the scene

• Welcome
• Introductions (project team)
• Wolfson Open Science Lab (portal)
• 3D virtual Geology trip App (background)
  – real field trips + DVD
  – Second Life experiences
Second Life: a ‘social’ world

- an immersive experience
- sense of space
- sense of presence, co-presence
- spatial perception of sounds
- feeling of ‘flow’ and sense of engagement
- collaborative and contextual learning

Novel features of the 3D App

- 3D virtual Geology trip App
  - developed in Unity 3D
  - non-realism (e.g. drape maps over the terrain)
  - realism (design/representation), pedagogy
Site Model

LIDAR Model
Photogrammetry data

“Artistic” blending in to terrain model
Terrain features (trees, walls etc) – all detailed, vegetation level

Workshop plan

- Plan for the workshop
  - Demo and 5 minutes discussion
  - Opportunities and limitations (15 + 5)
  - Challenges (15 + 5)
  - Parking lot
Geology fieldwork in a 3D environment

- authentic and interactive 3D simulations
- realism and high degree of fidelity
- virtual embodiment in the form of avatars
- visual and spatial experience not constrained by a ‘flat’ 2D user interface
- helps internalise the sense of exploration
- real-time interaction and collaboration
Opportunities for students and educators

- practice for and reflect upon real life field trips
- learn by self-exploration and in teams
- seeing and doing what you can’t in the real world
- cutaways into a mountainside to see the geology beneath
- flying across the landscape
- explore, observe and gather data within a context, e.g. using a virtual microscope

Kit Selection

Mandatory
- Hiking boots
- Hand lens
- Grain-size chart

Optional
- Waterproof clothing
- Sun hat
- Sunscreen
- Sunglasses
- Compass

“What other items would you choose to take on a real field excursion, and why? List them at the front of your notebook”
Sense of being there

Interactions in the space
Head-up Display

Navigation while walking
Navigation while flying

Site 1 interactions
Navigation to different sites

Toolbox for settings
Show Sketch points

Show Rocks
Pick up rock

Ability to pick up "hand samples": Hand sample will appear large scale, mid screen, and user will be able to view hand sample at higher level of detail and rotate/zoom – equivalent effect to a hand lens.

From a hand sample link to the Virtual Microscope by URL to browser

See Geology view
See Metamorphic view

Bring up slice
Arrive Site 2

Site Model

LIDAR Model
Photogrammetry data

“Artistic” blending in to terrain model

Terrain features (trees, walls) – all detailed, vegetation level