Pedagogical advantages of 3D virtual field trips and the challenges for their adoption

Conference or Workshop Item

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Pedagogical advantages of 3D virtual field trips and the challenges for their adoption

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Virtual Skiddaw: Virtual Geology Field trip

- Unity application developed in 2013 - 2014
- Support physical field trips: planning, on-site, revision, unable to attend
- 10km x 10km area of the Lake District within this virtual environment
- Walk, fly or teleport navigation (with compass & minimap); multi-user
- Terrain, Map and Geology overlays
Virtual Field Trip Service Ecosystem

Commercial
- IP
- Licensing aspects
- Relationship between schools, FE and HE
- Cost to schools; cost to HE

Pedagogical
- Effectiveness of physical field trips
- CPD for educators
- Lesson planning
- Inter-disciplinarity

Constraints
- Resources (budgets, time, technology)
- Digital literacy skills
- Assessment criteria are for physical field trips

Technological
- Relationship between schools, FE and HE
- Design and development
- Support and maintenance

Virtual Field Trip Service

- Create new locations and core lesson plans
- Under contract (if required)
- Geospatial subcontractor
- Web/Cloud
  - Multiple locations, eg: Skiddaw, Snowden, Everest, Moon
- VFTaaS Operator (Qaden)
  - New locations
  - New features
- Management/support costs

User institution
- KSI-5
- GCSE/A
- U/Grad
  - Students
- Experience: Virtual Field Trips
  - Create user-generated content
  - Payment per user, per loc, per aerial, per annum

Authoring institution
- Also likely to be a user institution, but could be non-educator
- Technically skilled education staff
  - Create new locations and core lesson plans
  - Revenue from others’ use
  - Payment per user, per loc, per aerial, per annum

Revenue/cost flows in yellow

Constraints
- Resources (budgets, time, technology)
- Digital literacy skills
- Assessment criteria are for physical field trips
pedagogy? value for students and educators

challenges of deployment schools higher education
physical field trip
how does a virtual field trip help?

pre  →  Physical field trip  →  post

Methodology

- Online survey: students, educators and fieldtrip professionals
- Workshops including two in Second Life (a 3D virtual world): school students and teachers, HE educators
- Interviews: school teachers, IT support/leads in schools, assessment bodies, Ordnance Survey
- Demos of Virtual Skiddaw

Over 120 participants from different stakeholder groups including international STEM colleagues in virtual world workshops
Findings: advantages of 3VFTs for students

- Development of fieldwork skills
  
  ...we feel that this could be a useful tool for rehearsing geographical skills - very important revision tool; it gives life to the curriculum” (meeting with an assessment body)

- Pre-fieldtrip orientation and preparation
  
  ...if they [3D VFTs] are able to make them prepared for a physical field trip - it is a really good idea - students like to get into rivers and on the beaches - river studies - flow meters - students collect the data - so, how they could be prepared for real-life work by having access to the kinds of data that they will be collecting (meeting with an assessment body)
Findings: advantages of 3VFTs for students

- Post-field trip de-briefing, reflection and revision
  After the real world field trip, a virtual world may be used to aid students' reflection on the experience, perhaps by revisiting features of particular interest to find out more or revising concepts that they didn't grasp the first time round. (an HE educator)

- Greater efficiency of physical field trips (in terms of time and number of physical field trips)
  *Much of the time in the field is wasted because students aren’t adequately prepared and able to start work immediately.* In biology (my field) species recognition is a particular problem and it takes a lot of time getting students to recognise and name species in order to carry out quantitative fieldwork. (an HE educator)

Findings: advantages of 3VFTs for students

- Replacement or near-equivalent experience for students with mobility and other constraints
  *...my school is very rural... Field trips simply can’t happen. This gives us an avenue and they enjoy it. Adds incredibly to the curriculum.* (Biology teacher, Science Circle workshop)

  Have you heard of the pupil referral unit where students are taken out of mainstream education due to mental problems or behavioural problems or any other problems with the family - but they have ‘right to access’... so, I do think that VFTs will be helpful for accessibility. It will open the doors for them particular when you saying that VFTs can be used for different subjects like Geography, Geology and will bring the curriculum “alive”. (meeting with an assessment body)

- Being able to complete physical field trips that may have got disrupted by weather or other interruptions
  *If the VFT has the same location as the physical field trip, activities that would otherwise be ‘lost’ can be conducted in a VFT.* (meeting with an assessment body)
Findings: advantages of 3VFTs for educators

- Enable educators to rehearse and plan before a physical field trip; yes, absolutely VFT will be perceived as a useful tool for educators to prepare their lesson plans for physical field trips; but the skills are varied. (meeting with an assessment body)
- Continuing Professional Development (CPD) for educators
  CPD for science teachers in the UK is poorly supported and undervalued in schools. Also scientists don’t talk to geographers etc. There is an opportunity here [with the VFT and VFTaaS]. (email correspondence with a field studies expert)

Findings: challenges

- Being convinced about the role of VFTs
  I am gravely concerned about how virtual scenarios are looked increasingly upon by university management as viable alternatives to genuine fieldwork, idealised learning scenarios do not offer any alternative to the development of real field observational skills, and they offer the students an unrealistic alternative to real geology, which is never available for genuine geological work.” (survey; educator)
- Digital literacy skills of educators
  With GIS also, we have found that educators have different level of expertise; not all teachers are IT literate. (meeting with an assessment body)
Findings: challenges

- IT infrastructure and support in institutions

Some schools have just one PC for the entire classroom while other schools are buying iPads for each student. (meeting with an assessment body)

Faculty can use whatever they choose, but IT will only support what they deploy. Cost and possible extent of use across the university would be considered by IT before a new deployment. (survey; educator)

Our external access is controlled by the Local Authority – so you need to get them on side (ICT manager at an Academy schools)

VFTaaS Key Questions

- Does the Virtual Field Trip as a Service concept sounds like something that would be useful to you and your school/college/university/students? What needs would it address?

- What do you see as its biggest attractions/benefits?

- What do you see as the biggest challenges to getting this into teachers hands (i.e. getting it into the school)?

- What do you see as the biggest challenges to getting student and teacher value from it?

- What payment models would be acceptable to institutions?

- In comparison to Second Life/OpenSim what would you like to bring/leave/add to VFTaaS?