Hotspot - The blended delivery of a computer based site investigation simulation

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1. Introduction

The Hotspot simulation recreates the preliminary stages of a site investigation of contaminated land. The student is required to identify the location of the most contaminated areas by devising a strategy for soil sampling and analysis achievable within a fixed financial budget. The simulation was introduced into Stage 3 of the BSc Environmental Science at the University of Plymouth in 2003. Hotspot was implemented in a blended fashion alongside lectures, fieldwork and directed reading. Evaluation was aimed at assessing the program's usability and educational value.

2. Why Simulation?

We thought that simulation would be an effective way of enhancing students' learning of site investigation. The previous approach comprised a group field visit (with sample collection), sample analysis and report writing. The advantages anticipated from using simulation were:

- an increase in student's responsibility for the design of sampling and analytical strategies.
- a decrease in student's time spent on repetitive tasks.
- final reports would be based on individual datasets
- students would experience more than one type of site

3. Design Criteria

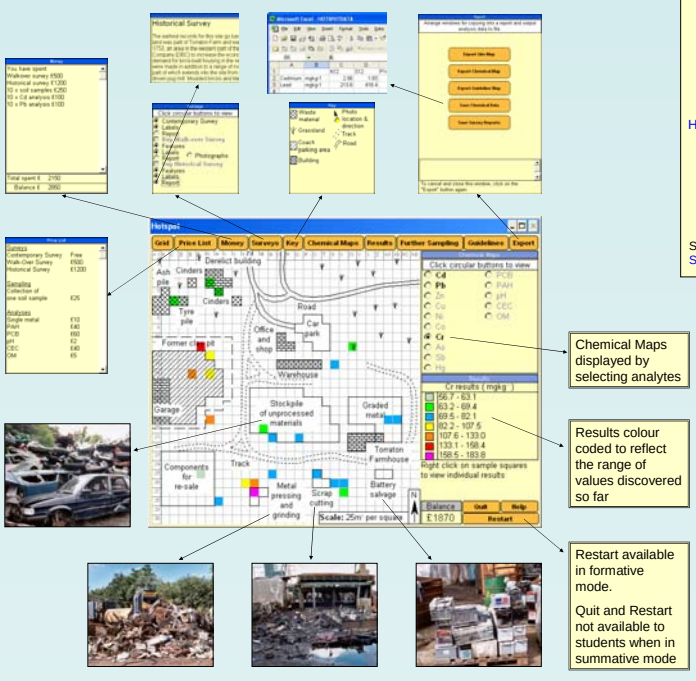
The simulation was designed to:

- address the disadvantages of the previous approach (See Section 2)
- be based on sound pedagogic principles (See table below)
- provide an experience that resembles reality
- develop knowledge and skills appropriate for site investigation
- offer formative 'practice sessions' as well as opportunity for summative assessment
- allow users to proceed at their own pace
- be enjoyable, exciting and easy to use

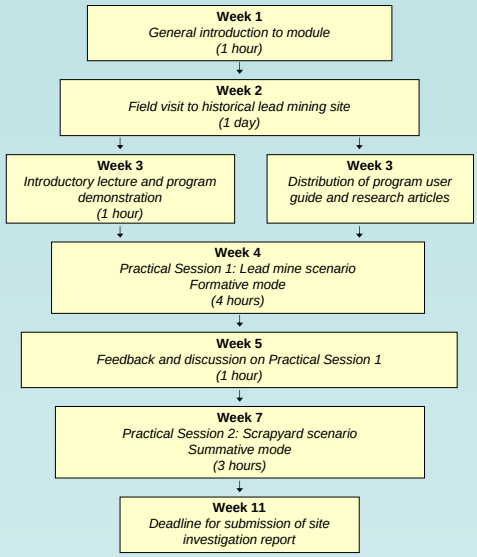
Theoretical Framework	Application of Principle	Relevant Authors
Experiential Learning	Experiential learning cycle should be fulfilled with simulation substituting for the real experience	Kolb (1984) Healey and Jenkins (2000)
Spreading Ripples	Software should address the four criteria termed "Wanting", "Doing", "Feedback" and "Digestion"	Race (1994) Richards (1996)
Maximising Learning	Learning Process should be individualised. Software complexity should not interfere with learning	Somekh (1996)
Conversational Framework	Software should provide meaningful intrinsic feedback and opportunity for extrinsic feedback	Laurillard (2001)

4. Hotspot Simulation On-Screen

The main screen and potential user pathways are shown

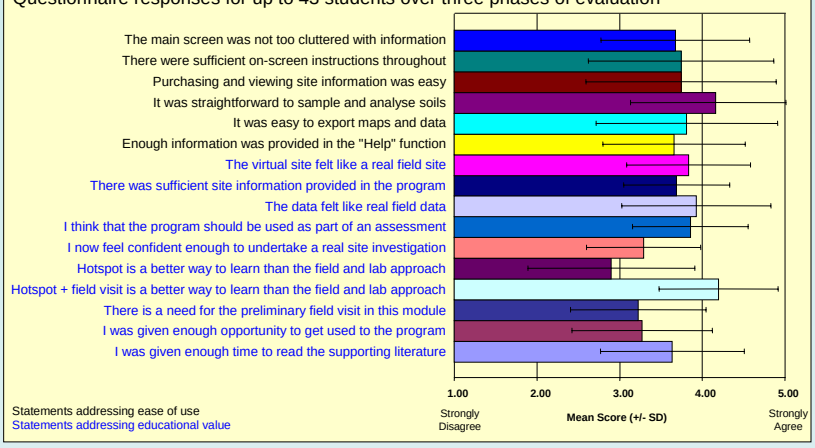


5. Implementation



6. Evaluation

Questionnaire responses for up to 43 students over three phases of evaluation



7. Conclusions

- The intended design criteria were met.
- Using Hotspot is an improvement on the previous approach and this improvement is defined by:
  - a shift in students' focus towards strategic and evaluative thinking.
  - a more individualised approach to learning and assessment.
  - availability of a variety of contamination scenarios
- Hotspot's success relies upon its blended delivery in particular the inclusion of a real field visit relevant to the formative session.
- The simulation produces scientifically credible data in a vocationally relevant context and incorporates elements of gameplay.
- Using Hotspot enhances students' scientific knowledge, awareness of budgetary issues and professional confidence.

References

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