Enhancing children's learning in museums: A Design-Based Research Approach

Tony Hall, Learning Sciences Research Institute, University of Nottingham, UK, tony.hall@nottingham.ac.uk
Liam Bannon, Luigina Ciolfi, Paul Gallagher, Kieran Ferris, Interaction Design Centre, University of Limerick, Ireland,
Email: liam.bannon@ul.ie, luigina.ciolfi@ul.ie, paul.gallagher@ul.ie, kieran.ferris@ul.ie
Ruth Mulhern, The Hunt Museum, Limerick, Ireland, ruth@huntmuseum.com
Nora Hickey, Lewis Glucksman Gallery, University College Cork, Ireland, nora.hickey@ucc.ie

Abstract: This paper reports research, conducted in collaboration with the Hunt Museum, Limerick, Ireland, which explored the design and deployment of novel ubiquitous computing to augment children's learning in museums. The paper summarises a Design-Based Research process. The poster will display the final results of the research. The authors have presented the initial and interim findings at the previous two ICLS conferences (e.g. Hall et al, 2004).

The Design-Based Research Process in the Hunt Museum

The aim of the research described here was to make a difference in the way children experience artefacts and museums. Thus, it was of paramount importance that the design process was sensitive to the museum's many important stakeholders. Previous research (Rogers & Edwards, 2002) had identified lack of consultation with educational and curatorial stakeholders as a major barrier impeding the design of successful exhibitions in museums. Furthermore, it was decided to adopt a Design-Based Research (DBR) approach because there is a commitment within DBR both to improve design practice and also to enhance scientific understanding of how design affects learning (Barab & Squire, 2004) In all, the Hunt Museum DBR process encompassed six main design activities or consultations:

1. Technical experimentation (six probes, where the interactive capabilities of a number of innovative computer technologies (e.g. RFID, WebCam tracking) were tested, both in lab settings and in the Hunt Museum);
2. Consultation of children's history and museum education policy (as outlined in the Irish Primary School History Curriculum and the ICOM (International Council of Museums) charter);
3. Design, development and evaluation of a large-scale interactive museum exhibition, *Exploring Digital History* at Nottingham Castle and Museum, which preceded and significantly informed the development work for the exhibition in the Hunt Museum;
4. Observational studies (of schoolchildren's interactions in two interactive museum workshops, a simulated archaeology dig and time machine);
5. Consultation of museum and Hunt family experts (docents (the museum's specialist guides), curators, museum education officers, Hunt family biographer);
6. Scan and evaluation of physical/spatial constraints of the museum.

As is characteristic of most Design-Based Research, the design process was closely informed by an orienting theoretical perspective. The conceptual or theoretical framework for the Hunt Museum comprised eight major design concerns or themes: (1) materiality; (2) narrativity; (3) sociality; (4) activity; (5) multi-modality; (6) engagement; (7) computer as augmentation tool; and (8) pedagogical activity.

The Design Product: *Re-Tracing the Past*

The space limitations of a conference poster proposal constrain the depth of the discussion of the analytic data, particularly as over sixty hours of video data, (in addition to other data collection activities and instruments such as questionnaires, interviews and pre- and post-visit school visits), were collected and analysed. Overall, the evaluation of the exhibition revealed that *Re-Tracing the Past* had a positive impact in terms of the eight design themes: materiality, narrativity, etcetera. For detailed discussion of data

pertaining to each theme, the authors refer the reader to more comprehensive accounts of the research (Hall & Bannon, 2005) on which this paper is based. The images below show children interacting with various features of the highly innovative and successful interactive exhibition. The final design in the museum was a replica study room and adjoining mysterious room, which contained interactive fittings. The design of the exhibition in the Hunt Museum embodied the theoretical frame described previously, and children's experience of *Re-Tracing the Past* was a highly positive one.

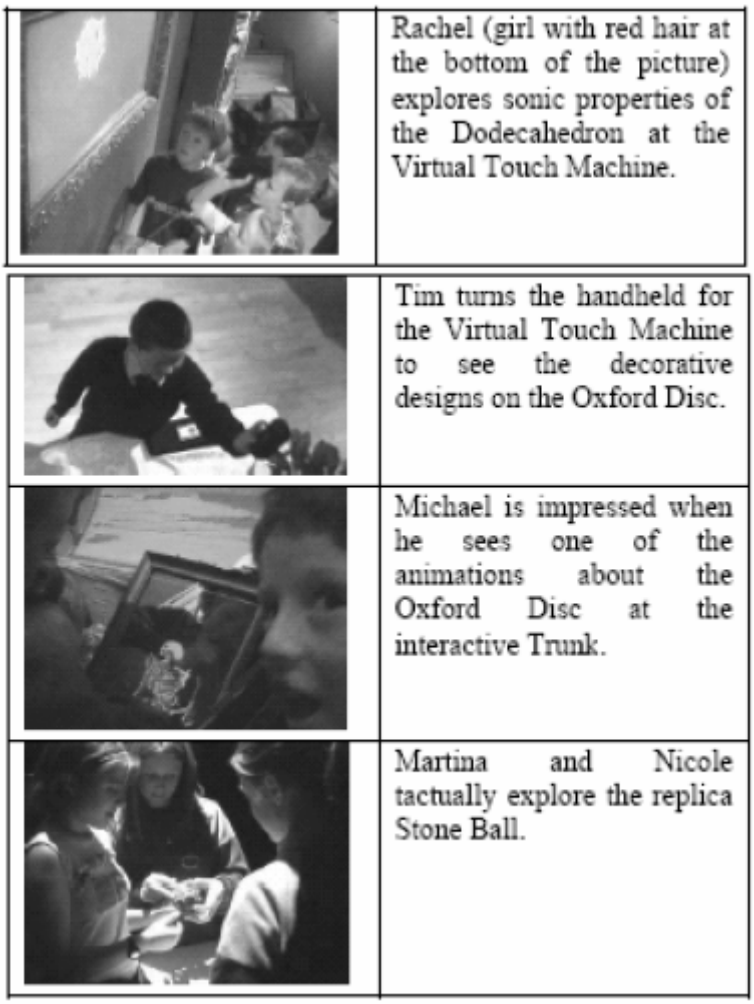

Figure 1. Snapshots of children's interactions in *Re-Tracing the Past*.

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