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# Exploring students' museum experiences in the context of web-based learning environments

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**Abstract:** The paper examines the nature of school excursions to museums, and how the Internet, and in particular the web pages accompanying museum exhibitions, can be utilised to create authentic and complex learning environments for school students. The paper describes proposed research between a university and two leading museums that will investigate whether and how learners link web-based content and data in developing a broader perspective on the museum experience. It will explore in depth the use of the web to situate the onsite museum visit, not as a single one-off event, but within a complex task or problem-based learning approach that extends beyond the museum visit itself.

## Introduction

The nature of learning in museums is an area of increased interest to educational theorists and practitioners. From the early years of the Internet, museums have embraced the World Wide Web as a means to advertise their exhibitions, provide visit planning support, and present resources related to their collections. However, more recently, museum websites have become an important means to educate and inform the public in their own right, often without an expectation of a subsequent visit.

Much research has been conducted on the museum experience and how people learn from their visit to onsite exhibitions (such as Falk & Dierking, 2000; Anderson, & Lucas, 1997; Falk, 2004; Hein, 1998). Since the mid 1990s, a great deal of research has also been conducted on the design and role of museum websites (such as Kenderdine, 1999).

What appears to be lacking is research on the role of the web in facilitating and enhancing the museum visit for school students in an authentic and pedagogically sound way. Student access to the expanding and appreciably diverse range of online resources worldwide has resulted in significantly wider use of the web for educational purposes as educators strive to design intellectually challenging learning tasks that engage their students. Such 'rich' tasks need to provide opportunities for both individual and collaborative learning, provide opportunities to demonstrate critical thought, provide an authentic representation of knowledge and practice from 'real-world'

contexts, and connect to the world beyond the classroom. This paper outlines a collaborative study to be conducted with two leading Australian museums to investigate the potential of these opportunities.

Constructivist approaches to learning suggest that important elements in the design of a learning environment include authentic contexts, authentic tasks, multiple views and perspectives, opportunities to reflect and articulate, and appropriate scaffolding by a teacher—all of which can be difficult to provide in a limited site visit to a museum. While there is little doubt that those experiences and elements that museums do provide may be difficult to achieve in other educational settings, the single onsite visit to a museum differs from the more sustained reflective learning environments found in schools.

Learning environments, if well designed, can support learner construction of knowledge through structured or ill-structured problem solving experiences or through more creative expression. The assumption is that within these environments the learner is supported by visual metaphors constructed to represent the way such information would normally be acquired in the real world. The authors' recent work in learner interactions and engagement in school visitations at Sydney Olympic Park (cf. Brickell & Herrington, 2004; Brickell, Herrington & Harper, 2005a, 2005b) indicate this development has the potential to model best practice in the use of digital technologies to enhance the promotion of advanced thinking skills through student-centred approaches to learning. The proposed study reported here has been designed to further explore the nature of Information and Communication Technologies (ICT) support and learner interactions that can be offered to support school children in exploring the rich resources and learning opportunities that can be constructed through well designed museum websites supporting visitations.

## **Authentic Contexts for Learning: Visitations**

At the school level, contexts for learning are often limited in the experiential component. Many teachers feel overwhelmed by the difficulty of inventing authentic learning contexts, and creating tasks that truly reflect the way knowledge would be used in the real world (cf. Herrington, Reeves, Oliver & Woo, 2004). However, there are growing numbers of examples of how such authentic learning environments are being used in schools and higher education in a variety of contexts and discipline areas, such as in literacy education (Ferry et al., 2006), in physical activity fitness and health (Rice, Owies, Campbell, Snow, Owen, & Holt, 1999), in Indigenous education (Marshall, Northcote & Lenoy, 2001), in evaluation (Agostinho, 2006), in multimedia and ICT (Bennett, Harper & Hedberg, 2001), in literature (Fitzsimmons, 2006), and in business writing (Pennell, Durham, Orzog & Spark, 1997). Teachers who subscribe to this approach to learning can be very inventive in developing learner perceptions of authentic contexts, but often financial, situational and time constraints limit the experiential elements of authentic learning settings. For example, often this experience is either overlaid with activities that are carried out in isolation to the learning setting, or it is so distracting for students that it is difficult for teachers to obtain the learning returns that the visitations have the potential to generate. ICTs have the potential to make the links between learning environments external from school settings, and facilitate authentic and situated approaches to learning not readily available except by direct and extended visitation. Additionally, this type of access will change the way that remote schools, particularly important in Australia, can access these collections.

The Remotely Accessed Field Trips project, RAFT (Terrenghi et al., 2004), is a fine example of use of these new types of learning settings where learners and teachers are embedded in real world scenarios using ICTs. In this project the core resource is a web environment, where students with mobile devices can access data during field trips. Small groups of students go on field trips while participating schools interact via the Internet. Data from the field groups (text, graphics, pictures, video) as well as video conferencing facilities allow direct interaction between the field and the classroom.

In general, museums are concerned with interactions between people and resources in representing the past, and until recently these interactions have been largely place bound, that is, in museums. However, progressive museums have been very proactive in examining ways for these interactions to extend beyond their walls through travelling exhibits, and specialised schools programs. Some of the earliest illustrations of the utility of the Internet involved offering virtual access to museum exhibits (Sumption, 2006). The Museum Open Learning Initiative, MOLLI, ([www.molli.org](http://www.molli.org)), for example, has developed a series of virtual learning environments, based on some of

their collections. Dillon and Prosser (2003, p. 14) have argued that ‘When an individual visits the website he or she ... becomes part of the associated Internet community...’. The site claims that MOLLI offers ‘a unique opportunity for school children... to prepare for, undertake and follow up a visit to the museum’. There is also a strong tradition of museums working in collaboration with education systems as partners, offering teachers pedagogical and lesson planning support, based on their rich collections. A recent specific example is the Alaska Museum that has developed a series of teacher resources on history virtual tours of the coast and the Alaska gold rush (Din, 2005).

What is missing in all of this work is a broad understanding of how learners link content and data beyond that included in the virtual environment represented by the web site in developing a broader perspective on the museum experience situated within a complex task or problem based learning approach that extends beyond the museum itself. Sumption (2006) has offered an exciting new direction for museums in operationalising these concepts through what he has termed the *ubiquitous museum*. Drawing from the past trends in museum take up of technology, Sumption has proposed that new communication technologies have the potential to turn individual museums into ‘a knowledge ecosystem interconnected community of symbiotic curators, learners and pleasure seekers, all bound together by mediating technologies, intent on delivering face-to-face and machine-to-machine dialogue’ (p.7), that is, virtual and real museums supporting constant interaction between all participants.

There are some well developed examples of situated learning experiences being linked with complex student tasks through the web. RAFT is one example, and the Sydney Olympic Park online project is another. This project features an online infrastructure to support an extensive range of educational, cultural and tour experiences for park visitors and has a focus on exposing the rich resources and history of the park to learners of all ages, making use of the latest technologies in innovative ways. Our recent work in this development (cf. Brickell & Herrington, 2004; Brickell, Herrington & Harper, 2005a, 2005b) has utilized a situated framework in developing a model of learner engagement that views learning as an active and interpretive process of construction rather than the memorization of factual information. With its origins in a ‘traditional’ excursion model where students are taken from the classroom environment and placed in the visited environment, albeit often with little connectivity between the two, the approach adopted utilizes the power of ICTs to engage students through an online environment. This places the excursion in the context of an integrated three-phase process to the inquiry-based task—a pre-visit phase (classroom environment), a fieldwork phase (excursion environment) and a post-visit phase (classroom environment). The provision of a range of technology tools allows students to store, retrieve and analyse any data they collected in the fieldwork phase, and return to it at any time for further analysis. This data can then be compared and contrasted to historical data of the same measures, a facility that immediately increases the learning potential of the activities.

The online environment (i.e. the *Geography Challenge*) engages students through the development of quality learning experiences that have relevance to practices in everyday life. Such experiences require a broad range of cognitive, linguistic and social skills that extend the intellectual capabilities of the learner leading to improved student outcomes. The learning sequence, represented by the learner challenge, has been developed with optional and essential sub-tasks in each of the three phases of student engagement (Figure 1). Teachers are able to guide students in choosing a set of essential tasks for pre- and post-visit experiences that are clearly integrated to the fieldwork associated with the visitation to the Parklands.

Much of what has been learnt from these projects that have taken a situated view of learning, can be applied to the virtual museum context, taking up the challenge that Sumption (2006) has set for such collaborations to move towards ‘knowledge ecosystems’. A research study has been planned to explore in depth the nature of collaborations between schools and museums in creating more ubiquitous environments. The study will investigate the relationship between museum exhibits and their associated websites, and the nature and extent of use by students from participating schools.

Group: Kangaroos | User: Whole Group | Log out

Introduction 1 2 3 4 5 6 7 8

Collecting data

Tasks Resources Your notes R.A.P. Our challenge Help

**Step 5**  
Collecting data

Much of your data will be collected on the fieldtrip to the Narawang Wetland - some will be collected at your school.

Arrange a meeting with other members of your team and reflect on your progress. It's a good idea to regularly review your challenge and think about how the information you are collecting supports your research questions.

Review your [Research Action Plan](#) to see if you have the necessary information to support your investigation.

Use [Your notes](#) to help you plan your visit.

**Tasks**

Collection of data to support your research questions requires careful planning.

Before you commence your fieldwork preview and interpret the data entry screens for the activities.

After collecting your primary data in the Narawang Wetland your group will complete the data entry screens at computer terminals in the computer lab.

The GIS activity will provide an opportunity to review secondary data that may further support the investigation into your chosen theme.

- ▶ [Weather monitoring](#)
- ▶ [Transect](#)
- ▶ [Abiotic testing](#)
- ▼ [Biotic testing](#)

This activity investigates physical, chemical and biological features of the living factors associated with the water in Pond 22 and its surrounds. It involves collection of water samples to study macro-invertebrates.

[Preview the "Biotic testing" activity](#)

[Go to the "Biotic testing" activity](#)

- ▶ [Stormwater collection](#)
- ▶ [GIS investigation - secondary data](#)

◀ Group or individual login

◀ Steps in the Inquiry Process

◀ Support Links for the Inquiry

◀ Tasks are provided in each phase of the Challenge to engage students

◀ Task outlines are revealed through disclosure triangles

◀ Field activities are previewed at school and collected data entered in the field setting or in the post-visit phase.

Figure 1: Interface for data collection during fieldwork

## The Study

The proposed research will explore access to the museum environment with online investigations, and investigate whether and how learners link content and data beyond that included in the virtual environment represented by the web site in developing a broader perspective on the museum experience. It will explore, in depth, the use of the web to situate the onsite museum visit, not as a single one-off event, but within a complex task or problem-based learning approach that extends beyond the museum visit itself.

### Research questions:

The research will endeavour to answer the following questions:

- What is current practice for the use of museum websites (a) to support museum visitations by schools, and (b) for non-exhibition related educational activities and information?
- What factors and pedagogies influence the design and development of education materials (a) to accompany museum exhibitions, and (b) for non-related educational activities?
- How do teachers use museum websites to prepare for visitations? To follow up visitations?
- What strategies do teachers use to embed the museum onsite visit into meaningful tasks and activities for students beyond the visitation itself?

## Research plan, methods and techniques

The research will comprise the first two phases of a design-based approach (Brown, 1992; Collins, 1992; Reeves, 2000; Reeves, Herrington & Oliver, 2004) to explore a significant educational problem. Reeves (2000) described four principal phases in design-based research (also known as *development research* or *design experiments*). Phase 1 comprises an in-depth analysis of practical problems by researchers and practitioners, which leads into Phase 2 where a solution will be developed within a theoretical framework. In the remaining two phases, the proposed solution will be implemented and evaluated, and finally, design principles will be documented and published.

The research described here will investigate the nature and use of web-based resources and activities to support on-site museum visits, to complete the first important phase of design-based research. This phase will comprise several connected explorations, specifically:

1. An exploration of research literature to examine recent research in *informal learning* or *free choice learning* that relate to web-supported initiatives of visitations or field trips.
2. A systematic exploration of national and international museum websites to find examples of web-based information and activities to support museum visitations embedded in complex tasks.
3. An exploration of two case studies of the physical context of exhibitions will be carried out in two participating Museums: the Powerhouse Museum in Sydney, Australia and the National Museum of Australia in Canberra. One exhibition, relevant to school curriculum, will be explored from each museum and a detailed analysis and description of exhibition and its supporting website, and how it links to curriculum, will be carried out.
4. An exploration of museum expertise will determine the pedagogical approaches to educational materials and services used in the design of exhibitions and their accompanying website resources. Museum staff will be interviewed (curators and education personnel).
5. An exploration of teacher and student needs will examine the views of target users of exhibitions and their use of websites to prepare for and follow up school visitations. Interviews and/or group interviews will be conducted with teachers who accompany classes to the museum exhibitions.

The artefacts and key personnel to be used in the first phase encompass: the research literature, a review of existing museum websites, two current exhibitions, and the museum personnel and teachers of students visiting the exhibitions. Data collection will include, research papers, web searches, analysis of exhibitions and their websites, interviews, and focus group interviews.

The second phase of the design-based approach will comprise the proposing of a 'solution' to the problem explored in depth in Phase 1 of the research. This solution will comprise a model, based on a theoretical framework, that might address the problem of isolated one off museum visits that frequently fail to have any connection to student learning or school curriculum. This phase will comprise the preparation of guidelines on the design and use of museum websites to support visitations embedded in complex tasks.

The third and fourth phases, where the solution is implemented and evaluated, and final design principles are articulated, will be the next stages of the authors' and museum partners' research agenda on this project.

The in-depth exploration of two exhibitions and their supporting web-based activities will give some insight into the pedagogical dimensions of museum exhibitions, and allow the researchers to map recent theory and research into how people learn in museums with recent thinking on authentic learning environments in schools and the completion of sustained and complex tasks.

## Partnerships in Research

The proposed research will be conducted in collaboration with two pre-eminent museums in Australia. The *Powerhouse Museum* in Sydney and the *National Museum of Australia* in Canberra, as well as being major tourist attractions, house significant and valuable collections that support learning in K-12 educational curricula. The use

of museum websites in supporting learning prior to, and independently of, museum visitations are important areas of research interest for both museums, and they are ideal environments for a deeper exploration of the use of exhibition websites for school excursions.

Access to museum exhibitions will be provided, together with the time of curators and education personnel to assist the research and to be interviewed. This agreement of the museums to contribute to and collaborate on this research shows a commitment to the theoretical understanding of the role of the web in facilitating learning. The museums are also interested in more practical principles of online learning, and how it complements visitations, that may emerge from the research.

## Conclusion

The movement by museums to provide hybrid representations of material culture through digital resources, as well as the more traditional physical artefacts, has been a widespread response to the increasing capability and pervasiveness of the Internet in all aspects of modern life. Sumption (2006) has noted that despite some concerns that the *physical* is in danger of being replaced altogether with the *digital*, the Internet should provide no threat to the ‘materiality’ of museum objects: ‘Far from diminishing it, ubiquitous museums will surely intensify the need for emblematic objects that signify the extraordinariness and ever-rarer primary nature of human experiences’ (p. 8).

This paper has argued that, in an educational context, the physical visitation to museums by schools is a valuable and useful curriculum event, but that as an isolated event, it is insufficient to facilitate rich learning outcomes. The proposed project plans to explore how the Internet can be used to provide the context of an authentic and complex task, requiring a range of resources for its completion—including a museum visit. In so doing, the physical visitation will be examined as a key primary experience embedded within a complex problem-solving process.

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