University collections and object-based pedagogies

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Abstract

Engagement with objects, either directly or through digital media, has long been recognized as a viable, constructivist pedagogy, capable of mediating significant meaning and context. The increasing uptake of digital technologies in university learning and teaching programs provides a timely opportunity for integrating museum and collection data and metadata in these programs.

This project looked at the use of university museum and collection objects in teaching programs through a controlled experiment. A group of students were exposed directly to collection objects while another group was exposed to their digital surrogate. Students were then tested at later stages concerning their recall of didactic information. Results clearly show that students exposed to the original object had far better didactic recall over a longer time period than students exposed to their digital surrogates. This has implications for the development and rapid expansion of online education delivery in the tertiary education sector and elsewhere and the role university collections can play.

Introduction

Developing positive learner experiences in higher education through a mixed pedagogic approach with measurable outcomes is essential. Engagement with objects, either directly or through digital media, has long been recognized as a viable, constructivist pedagogy, capable of mediating significant meaning and context. The increasing uptake of digital technologies in university learning and teaching programs provides a timely opportunity for integrating museum and collection data and metadata in these programs.

The concept at the core of this project is the desire to enhance the learner experience in a range of inter-disciplinary contexts through the development and/or enhancement of object-based pedagogies. This aim was in accordance with promoting "excellence in learning and teaching"[1] and the proposal was successful at securing initial funding through the 2010 Priority Grants Scheme at Macquarie University. This is an internal funding scheme that supports new developments in teaching and learning on campus that have the potential for broader application and adaptation for use by university teachers. To achieve this funding support it was necessary to prove that the proposal aligned with the scheme's goals of guaranteeing quality and on-going enhancement to both curriculum and teaching methods employed via flexible pedagogical patterns; by providing resources for new ways of engaging and research that in turn informs learning and teaching practice.

Conceptualizing the proposal was based on the initial observation that many university museums have developed from teaching collections. Historically speaking, some academic areas lend themselves more readily to the development of collections than others. The report *Museums in Australia 1975*, otherwise known as the *Piggott Report*, recognized geology and anthropology as the two intellectual areas most likely to develop university collections in Australia at the time. These subjects have always traditionally entailed an approach that, at least partially, was supported by object engagement. As noted by Chatterjee (2010) object-based learning was an integral part of the student experience in the 19th and early 20th centuries.

It is well known, however, that changing pedagogic approaches and changing research and outreach priorities over time can have a significant impact on the value a university ascribes to a material

[1] Goal 2 of the university's 2008 to 2012 Learning and Teaching Plan.

collection and hence even its survival in an academic context (MEADOW 2010). Furthermore changes in the actual academic structure of the university through the merging and splitting of departments and faculties may also have an impact on the long term viability of an academic material collection.

To maintain material collections, it is therefore essential to extract the maximum amount of value from them in supporting the business of the university. In the area of learning and teaching, the ability to deploy a collection for new pedagogic purposes beyond the intellectual area that first fostered the growth of the collection, is therefore a valid extension of collection utilization that builds new value and purpose for the collection. The opportunity to pursue new creative uses for collections in teaching, however, is not always apparent to teaching staff within a university who may have little knowledge of available material and / or be bound by traditional academic discipline practice that precludes an exploration of inter-disciplinary teaching options. New uses for collections are therefore often best brokered by staff working directly with university collections themselves. These people are best placed to develop new creative uses for the objects within their care in line with the institution's aspirations.

Desired outcomes

In 2008 Macquarie University undertook a thorough overhaul and restructure of its undergraduate degree programs. Part of this restructure included the establishment of what are called 'people' and 'planet' units. These are units of study from all parts of the university that are considered to satisfy the following specific criteria in addressing the development of cognitive capabilities among learners. 'People' and 'planet' units are now established as the central strategy for cross-disciplinary undergraduate learning experiences at Macquarie University. These units are delivered to cohorts of students with diverse backgrounds and interests.

'People' subjects focus on the development of what it means to be engaged and ethical local and global citizens. Subjects accredited as 'people' units are concerned with engaging students with the challenges of contemporary society and with knowledge and ideas; open to other cultures and perspectives; and with a sense of connectedness to others and country. 'Planet' subjects engage students with an understanding of science and the challenges of issues currently facing the world. Subjects accredited as 'planet' units are concerned with the development of students who will have a level of scientific and information technology literacy, and who will be informed and active participants in moving society towards sustainability.

In the new curriculum all students will be required to complete at least one 'people' subject and one 'planet' subject as part of their undergraduate degree. This is to ensure students study some units outside of their primary discipline. These units are therefore attracting higher levels of enrolment that other units, but more importantly, will attract a diverse student clientele from a range of discipline areas.

For this reason these units were targeted for this project as they represent a central strategy for cross-disciplinary undergraduate experience. These units are delivered to cohorts of students with diverse backgrounds and interests – via various modes of delivery. Developing positive learner experiences through a mixed pedagogic approach with measurable outcomes is therefore essential to ensure the best results from the curriculum restructure. The value of engagement with objects, either directly or through digital media to create a space for mediating meaning and context (HOOPER-GREENHILL 2007), has long been acknowledged. The increasing uptake of digital technologies in learning and teaching programs by the digital native student (TAPSCOTT 2009; BRUMBERGER 2011) provides a timely opportunity for integrating museums and collection data in these programs and the challenges that may need addressing in this process.

The project is divided into two parts. The first aims to develop means of measuring both the value of object engagement and engagement with digital surrogates. The second part of the project will involve mapping unit content for 'people and planet' units against existing on campus collections.

Several methods have been employed to ensure measureable outcomes, the majority of which have been qualitative. These methods include measuring the pedagogic effectiveness of two forms of object engagement, and the initial development of a strategy for object-based learning in cross-disciplinary contexts and devising effective strategy for the use of material collections on campus to reach these outcomes.

Methods

The methods used to gain initial data for this project centered around controlled analysis of student learning experiences through their engagement with objects, and experiment on the retention of didactic information through direct and virtual engagement. Contact was made with the conveners of all 'people and planet' units of study running in 2010 – the year this project started – and a copy of the study guide was requested of each of them so that they could be assessed for both current use of material collections, and possible links to material collections for future use in their courses. Of the 52 conveners contacted, 22 conveners provided the study guide as requested.

The study guides provided by the unit conveners were examined for possible links that could be made to university collections. Some units were already actively using collections; this was limited in extent, and mainly confined to a limited scope within archaeology units (Ancient Cultures Museum material) and a few modern history units (Australian History Museum material). The potential of the many collections on campus was not being utilized to anywhere near their potential.

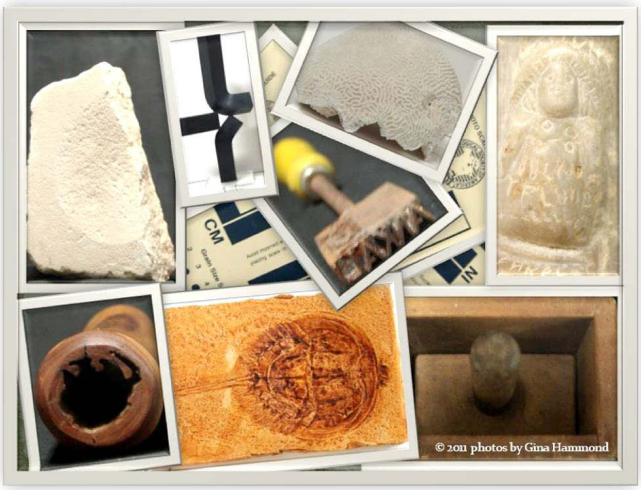

Fig. 1 - A selection of objects used for an experiment with students to test the differences in terms of retention of information through exposure to the original object in comparison with exposure to a digital surrogate. Photo: G. Hammond

While the authors have a fairly extensive knowledge of certain collections on campus, in-depth time was required with the databases of these collections to extract possible links to the people and planet units. The issues generated because of the way in which the varying collections accession and maintain records on objects within their collections will be explored further shortly, as this has had impact on the progress and direction of this project; however a diverse selection of objects from three collections were selected for use in the analysis of student learning experience generated through object engagement (see fig.1).

A first an obvious conclusion from the project is that a good, single unified information management system for all university collections is essential. Much of the poor levels of awareness by university teaching staff can be attributed to the difficulties in tracking down information about the content of collections in areas outside of the academic staff member's disciplinary interests. To foster cross-disciplinary uses of collections in teaching information must be readily available from all collections so that academic staff can consider the use of objects when designing and developing content for the individual units or subject areas they convene. An advanced system for teaching staff

should also have the capacity to record teaching uses of individual collection items, this could be achieved by tagging individual database items with subject or unit codes, semester dates, and even notes on how it was utilized. In this way a history of usage can be developed which can inform future curriculum design. This follows the same principles that many university libraries use to track the use of literature in a non-digital form. Metadata tagging also allows the building of extra context that can enable new cross-disciplinary possibilities.

Object engagement and student observation

Students used in this project were a mix of internal, external and composite mode under graduate and post graduate students, majoring in either the Faculty of Arts or the Faculty of Science at Macquarie University. Students were broken into two groups and asked to answer questions. Group one was able to observe the physical object; group two was able to observe a 2D image of each object on a PowerPoint presentation slide. Students were advised that session conveners could not discuss the objects with them; they were asked to think about each object and make an educated guess.

Participants from both groups were asked to answer the same questions:

- What do you think this object might be?
- What evidence or features of the object did you use to decide?
- Where would you expect to see this object?
- What sort of insight might this object give you about the environment and/or period of time it came/comes from?

These four questions were designed so that students would consider the object both in isolation and framed within a probable context linked to the student's previous experience (if any) or imagination (if not). An initial observation was that students with access to the physical object (as opposed to a digital image of the object) were more likely to establish the intended use of the object than those participants who merely observed the image – even though a scale was provided with each object image to give participants a concept of object scale. The physicality of object engagement cannot be readily reproduced by the digital surrogate used in this experiment.

In part two of the student observation, six weeks after the initial running of the projects, students that participated in the sessions were invited to answer an online survey that aimed to access knowledge retained from the initial engagement sessions.[2] Those students who initially had access to the physical object were more likely to retain knowledge about it and respond to the online survey appropriately answering questions about the object again suggesting there are distinct pedagogic advantages in direct object engagement in comparison with digital surrogates.

Value/Need for the project

This project consisted of two related primary strategies. The first stage is complete, and it tested the value of object-based engagement with both real objects and digital surrogates in a controlled experiment with student volunteers to evaluate the retention of didactic information in the short and longer term. The second stage is in progress and has the aim of mapping the unit content of selected people and planet units against content in three Macquarie collections with a view to the development of object-based narratives in support of unit learning outcomes. The conjunction of these two strategies will establish the impact and viability of cross-disciplinary uses of objects in teaching programs.

[2] Powered by surveymonkey.com.

Macquarie has a range of museums and collections, many of which were established to underpin learning and teaching programs in a number of specific academic disciplines as in most other universities. The following three collections (linked to project team individuals) will be used for the second part of the project where collections are mapped against unit content in selected people and planet units.

The Biological Sciences Museum (Faculty of Science) is currently under redevelopment. It has permanent collections that may be used through exhibition spaces and/or digital media. The refurbishment of teaching labs has created new exhibition spaces providing additional opportunities for student engagement with collection specimens (ESTRADA-AREVALO ET AL. 2011). The Australian History Museum (Faculty of Arts) has an extensive collection of documents and artifacts originally developed to support teaching programs within the Department of Modern History. The museum has a management committee with distinct interests in the deployment of collection items within academic programs. The university art collection (Office of Institutional Advancement) is a university facility outside the faculty structure. There is a continuous program of exhibitions including ones undertaken with departmental/faculty partners. No analysis of the contribution to learning and teaching has been undertaken previously. The content of the university's art collection is not broadly known among academic staff and the potential for images from the collection to contribute to learning and teaching programs is unexplored. These collections were selected primarily because they represent a science faculty collection, an arts faculty collection and a central university collection with potential for linkages broadly across academic disciplines. In this way the project mirrors the aspirations of the 'people and planet' curriculum strategy at Macquarie University.

The mapping of these objects to units is proving difficult due to the varied and unintegrated nature of the collection management solutions each collection uses. The three collections used in this study use three different systems. Although in the second half of this year a project has been funded to find a solution that will suit all collections on this campus, this is not a quick fix and it will be some time (assuming further funding is available) before the varied collections are searchable in a manner conducive to locating object links to curriculum.

Despite the difficulties, it is a line that must be pursued as the project contributes to the university's faculties/departments in the following areas:

- Learning outcomes, graduate capabilities – through enhanced student engagement;
- Curriculum renewal and inter-disciplinarity – through greater engagement of academic staff with museum collections;
- Teaching and learning spaces – through incorporating exhibition spaces into learning and teaching plans.

But, more specifically, the research that underpins the progress of this project directly contributes to the scholarship of learning and teaching. While there are examples of cross-disciplinary object based pedagogies in the literature these tend to be program specific rather than institutionally focused and based on qualitative rather than empirical data. One of the few institutions to develop an institution-wide object-based learning strategy is the University College London. It has been estimated that over 100 course units use object-based learning (DUHS 2010).

We believe that the methodologies developed in this project could have much broader application both within Australia and internationally. Obviously this has the potential to increase the understanding of the value of the collections on campus to the broader academic community for learning, teaching and research outcomes. Significantly, the value to teaching using objects should be integrated into the strategies of any tertiary education institution that holds material collections.

Final thoughts

The lack of an over-arching database search engine for the collections used in this study has severely hindered progress. There are preliminary steps to address this issue, but a date for this is not secure – and when it is available, the timeframe to upload current database information into a useable format for each collection will be time consuming.

It appears to be an accepted notion that students today are more visually literate then previous generations. Certainly they are bombarded with a constant stream of imagery via the internet. However, it could be argued and certainly preliminary results from testing suggest this, that instead of focusing on details and critically accessing an image, it is being skimmed and details are overlooked. Details that in the case of this study could have assisted the visual student groups make a more educated guess at the function of an object.

While it is possible to integrate physical exposure to objects for internal students, external students are disadvantaged. This is an area that should be focused on, especially as higher percentages of students undertake study over distance.

Strategies to re-engage students perhaps similarly but on a smaller scale to museum/distance student programs such as the Australian Museum's 'museum-in-a-box' program may be of use – though this may prove cost prohibitive; and logistically difficult if large numbers of students are enrolled in a set unit.

Ancient history and the Museum of Ancient Cultures are attempting to address the issue with the use of 3D scanning of objects. This is still in its early stages as they learn to drive the software. Currently it is a slow process. If it proves beneficial to student experience, more funding will be needed to utilize this technology for larger portions of the collection. But, will this actually deal with issues of poor visual literacy skills? If the issue is 'image fatigue' will simply having the object available in a new format be any more advantageous to the average fatigued student? Introductory instruction on visual literacy skills may be important for some units of study. However, perhaps it is time for teaching staff to consider the value of object literacy as a separate issue from the value of visual literacy.

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