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AUTHOR Naidu, Som; Anderson, Jaynie; Riddle, Mathew
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ABSTRACT

This paper describes work that has been in progress on the use of information and communications technology in the transformation of teaching and learning in several subjects in the School of Fine Arts, Classical Studies and Archaeology at the University of Melbourne, Australia. Its specific focus is on the "Virtual Print Room" project. This project involves the development of a rich database of high quality digitized images of a large number of prints (from the Baillieu Library's Old Master Prints Collection) comprising the works of famous artists such as Durer, Marcantonio, Raimondi, Rembrandt, and Hogarth. Most importantly, this database enables the study of fragile prints outside the "white-gloved" controlled environment of the conventional print room. One such novel form, described in this paper, is learning by designing a "Virtual Print Exhibition." Students involved in this subject create a virtual exhibition from the database of prints and experience at first hand how to construct an art historical argument in the form of an exhibition. As part of this presentation, the online learning environment that supports this group-based learning activity is demonstrated. (Author/AEF)

THE VIRTUAL PRINT EXHIBITION: A CASE OF LEARNING BY DESIGNING

Associate Professor Som Naidu
The University of Melbourne, Multimedia Education Unit, VIC, 3010, AUSTRALIA
Phone: 03-8344-7575: Email: <*s.naidu@unimelb.edu.au*>

Professor Jaynie Anderson
School of Fine Arts, Classical Studies and Archaeology, The University of Melbourne, VIC, 3010, AUSTRALIA. Phone: 03-8344-5564: Email: <*j.anderson@unimelb.edu.au*>

Mathew Riddle
The University of Melbourne, Multimedia Education Unit, VIC, 3010, AUSTRALIA
Phone: 03-8344-7591: Email: <*m.riddle@unimelb.edu.au*>

Abstract

This paper describes work that has been in progress on the use of information and communications technology in the transformation of teaching and learning in several subjects in the School of Fine Arts, Classical Studies and Archaeology at the University of Melbourne, Australia. Its specific focus is on the "Virtual Print Room" project. This project involves the development of a rich database of high quality digitised images of a large number of prints (from the Baillieu Library's Old Master Prints Collection) comprising the works of famous artists such as Dürer, Marcantonio, Raimondi, Rembrandt and Hogarth. Most importantly, this database enables the study of fragile prints outside the "white-gloved" controlled environment of the conventional print room. One such novel form (which is described in this paper) is learning by designing a "Virtual Print Exhibition". Students involved in this subject create a virtual exhibition from the database of prints and experience at first hand, how to construct an art historical argument in the form of an exhibition. As part of this presentation, we will demonstrate the online learning environment that supports this group-based learning activity.

Keywords

Interactive learning, simulation, teamwork, collaborative learning, old master prints, renaissance, baroque.

The Virtual Print Exhibition: A Case of "Learning by Designing"

The *"Virtual Print Exhibition"* is a collaborative learning task in which senior students of Art History work in small groups to plan and present a virtual exhibition of prints from a database of rare prints. This task comprises a core learning activity in a subject on Museology and Curatorship. The principal attributes of this innovative learning task are as follows. First, it offers students the opportunity to acquire knowledge not only by being told about it, but also by being involved in the experience of designing an exhibition (i.e., learning by doing). Second, it enables the studying of renaissance and baroque prints (comprising the works of famous artists such as Dürer, Marcantonio, Raimondi, Rembrandt and Hogarth) away from the snobbery and preciousness of the conventional print room. This is made possible with the creation of a rich database of high quality digitised images of the selected prints which students can access in an online and flexible learning environment to search for, select and view images in a variety of formats (i.e., thumbnail, zoom-in and zoom-out). Third, by utilising group work, it fosters collaborative learning whereby students work in teams to prepare a concept for an exhibition, which is then presented to a director of a museum. Fourth, by being an online learning task, it provides access to a resource of rich and rare collection of renaissance prints that is otherwise not readily accessible for teaching and learning. This work is currently in progress in the School of Fine Arts, Classical Studies and Archaeology at the University of Melbourne. In this paper we outline the educational foundations of the project, report on its development, and approaches to the formative evaluation process.

The Case for "Learning by Designing"

Design as a means for acquiring content knowledge is very appropriate in practice-based disciplines (Newstetter, 2000; Hmelo, Holton & Kolodner, 2000). For instance, design experiences such as building models in engineering make it ideal for the understanding of the subject matter. The obvious benefit of a design task is its inherent situatedness or authenticity. In design-based learning activities, students' understanding is "enacted" through the physical process of conceptualizing and producing something. The designer's knowledge is embedded in, manifested through, and articulated by the design artifact. The structures created, the functions sought, and the behaviors exhibited by the design solution offer a means to assess knowledge of the subject matter. As such a student's conceptual understanding or misunderstanding of domain knowledge can be ascertained from that artifact. The failure of that artifact, for example, may suggest an incomplete understanding of the subject matter.

A big advantage of a design task is the variety of cognitive tasks required to move from a conceptual idea to a product. These include information gathering, problem identification and constraint setting, idea generation, modeling and prototyping, building, and evaluating. These tasks represent complex learning activities in their own right, but when they become the environment in which knowledge of the subject matter is constructed, students have the opportunities to explore that content in the different phases and through different representations. The complexity of design activities makes them excellent vehicles for knowledge acquisition. Domains of knowledge or skills that might be separated out or abstracted away for individual treatment in other situations actually coalesce and mutually inform one another in design tasks. Moreover, design complexity requires iterative activity

toward better solutions that can support refinement of concepts. Design complexity also dictates the need for collaboration. A workable team possessing different kinds of knowledge and skills can tackle complexity more successfully than an individual. On student teams, one student might have good research skills, another domain knowledge, another drawing and representation skills, and another construction skills. When working together, the group can take on design complexity, combining the varied types of knowledge and skills and ideally, learning new things from teammates.

Implementing Learning by Designing

Implementing "learning by designing" tasks is a complex undertaking that needs to be carefully ochestrated (Barron et. al., 1998; Kafai, 1996; Kolodner et. al., 1998). The process of designing requires learners to manage multiple constrains while dealing with complex situations. Schauble, Klopfer, and Raghavan (1991) reported that, when students carryout design tasks, they tend to focus on creating products rather than *"constructing"* understanding and meaning. This is understandable because the outcome (some artifact that works or looks good) is a concrete product, whereas understanding the internal workings of a system or process is more abstract and less tangible. These authors suggest that the many tradeoffs in using design tasks to promote learning include:

- Striking a balance between having students working on the design task and reflecting adequately on the design activities. Incorporating reflection is important to encouraging an understanding-orientated approach.
- Being able to integrate real life experiences without letting it overwhelm the students with irrelevant information that might be distracting.
- Maintaining extended student engagement in a manner that emphasizes understanding of principles rather than task completion.

Our approach to the specification of the design activity in this project is based on an awareness of the above and the principles of problem-based learning (Barrows & Kelson, 1995). A problem-based learning (PBL) session begins by presenting a group of students with a complex problem to address. While working on the problem, students pause to reflect on the information they have collected, generate questions about the information, and hypothesize about underlying relationships that might help explain it, or potential solutions to the problem they are working on. They identify concepts they need to learn more about to address the problem and then they develop plans for proceeding. Students usually work independently to research the learning issues they have identified. They regroup to share what they have learned, reconsider their ideas, and/or generate new ones in the light of their investigations. They continue by attempting to address the problem, based on what they have learned, sometimes going over this cycle several times through question generation and additional research.

The "Virtual Print Room" Project

The *"Virtual Print Room"* project is part of a larger effort to transform the approach to teaching and learning of several subjects in Museology and Curatorship at the University of Melbourne. This work recognizes the role of new learning technologies in the management of collections, as one of the most important issues in contemporary museum practice. The database of print resources that is being developed as part of this work will be used by

specific art history courses on renaissance and baroque art which incorporate the study of old master prints. In its fully developed form, the Virtual Print Room would comprise an educational resource that will allow the study of fragile images outside the controlled environment of the conventional print room, and also in novel and innovative ways. One such form (which is the focus of this paper) is the design of a *"Virtual Print Exhibition"* on different themes from the electronic database of the prints.

Students involved in this subject are able to create virtual exhibitions from the database of print resources and experience at first hand, how to construct an art historical argument in the form of an exhibition. Curatorial students are able to gain an important experience by participating in the creation of a virtual museum. Most contemporary job descriptions in Australian museums ask for some knowledge of the implementation of new technologies, such as knowledge of digital image databases as all museums are engaged in the creation of on-line catalogues for permanent collections and temporary exhibitions. Students involved in this project are able to study the print collection in ways that has the capability to modernize connoisseurship by a comparison of details on the screen, through the use of detailed and high quality images at varying resolutions (see Figure 1). Close study of details also result in knowledge of how to determine the authenticity of prints, the techniques with which they are executed, and the authenticity of signatures and printers' marks.

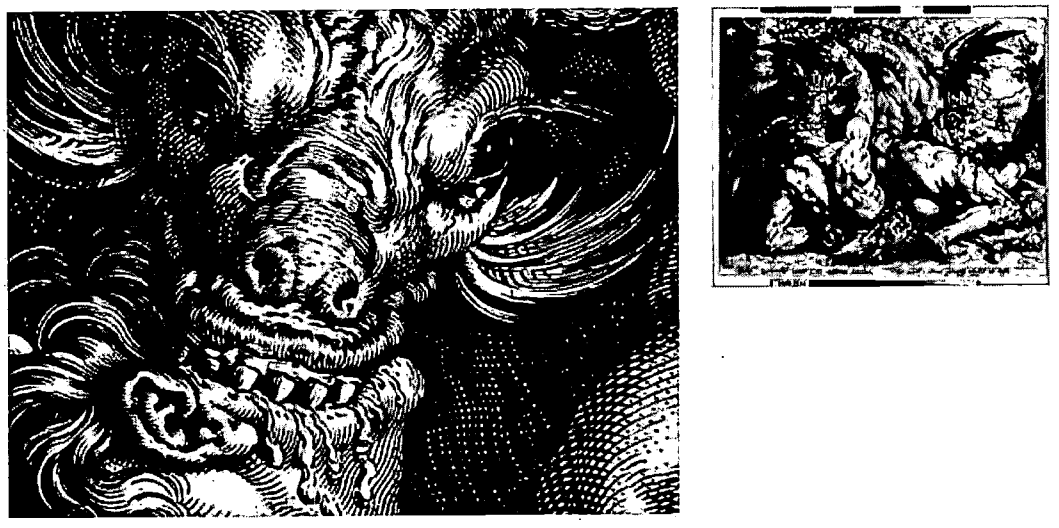

Figure 1

Prints have been scanned at high resolution allowing details to be shown on the computer screen at very high quality.

Getting Started

Students taking the subject that comprises the *"Virtual Print Exhibition"* project are presented with the following scenario at the beginning of the term.

> The *National Gallery of Victoria* (in Australia) is planning a major exhibition to celebrate the re-opening of its print room in 2003, for which they have received a grant of $100, 000. You and your colleagues have been asked to put together a *virtual exhibition* from the newly developed electronic database of Old Master Print Collection in the University of Melbourne Library. To accomplish this task, you will need to prepare a proposal, in which you design, install and curate an exhibition online, focussing on an appropriate theme of your choice.
>
> The Director of the Gallery would like to see you put together a detailed plan with time lines, and a budget with a detailed rationale before it can release the funds for you to begin work. The group with which you will work will have access to an asynchronous computer conference facility, to which you and your colleagues will be automatically subscribed. You must conduct all your planning activity using this medium. You should complete the proposal in three weeks time, submit it for discussion and feedback from other curators in the gallery, and the exhibition committee. You will be also required to present your team's proposal in a seminar to the director of the museum at a curatorial exhibition meeting.

This online learning environment that supports this group-based learning activity enables the use of a mixture of individual and team-based learning tasks. Students can work on their own to create exhibition proposals, for example, but must come to an agreement within their team about the content and layout of the final exhibit. As students engage in this type of learning activity, their work is stored in individual student *folios*, which are available for reflection upon by the students themselves, and which also comprise as records for assessment by the lecturer. Documents and messages produced for and by a team are available for review by all members of a team.

To produce the virtual print exhibition students have access to a very large online database of images and catalogue information about the prints. They can search this database for suitable prints, zoom in for detailed analysis, mark them for inclusion in their exhibit, and position prints on a "virtual wall" in the exhibition spaces (see Figure 2). We will be demonstrating the functionality of this environment as part of the presentation of this paper.

Figure 2.

The Virtual Wall: A layout tool that allows students to position their selected prints in various exhibition spaces.

Evaluation

The evaluation of the design, development and implementation of this project comprises:

- **Formative evaluation** (which focuses attention on improvement of the design and development processes of the teaching and learning environment. It comprises peer-review of the design specification and pilot testing of the course design with a sample of the users);
- **Summative evaluation** (which focuses attention on impacts, effects and/or outcomes of the teaching and learning innovation. It comprises evaluation of the full-scale implementation); and
- **Monitoring and on-going evaluation** (which attempts to keep abreast with the extent to which the innovations are being integrated into regular teaching and learning activities, and how students are coping with the innovation).

At the time of the writing of this paper, some aspects of the formative evaluation task (such as peer-review of the design specification) have been completed. More detailed data derived from other aspects of the formative and summative evaluations will be available at the time of the presentation of this paper.

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