

ENHANCING STUDENT LEARNING THROUGH PEER REVIEW IN A WIKI-BASED E-GALLERY

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ABSTRACT

An important aspect of design pedagogy lies in providing students with opportunities to discuss their own and other students' work in progress with students and tutors. As a result of the introduction of computers, design work is often screen-based, submitted electronically and digitally archived thus reducing the opportunities for learning from others. An e-gallery is a virtual, on-line environment within which artists and designers can display their work. In this paper we report experiences of using an e-gallery to enhance student learning. The content of the e-gallery was generated entirely by student learners using on widely available Wiki technology, embedded within a virtual learning environment. The project is designed to give students experience of a whole product design and development process submitting work to the e-gallery at key stages. Design work is initially peer reviewed in small groups where peer-to-peer and tutor-to-learner feedback is posted and recorded. Once this group review process has been completed the e-gallery is opened for all students to browse providing opportunities to view peer projects and both peer and tutor feedback. Early experiences of running the project suggest that the opportunity for analysis and reflection upon others students' work supports deeper learning, while the open access to all learners' work in the gallery generates motivation to produce higher quality work from the early stages of the project. Future versions could also include viewing and feedback from external bodies such as businesses reviewing design work at key stages during live briefs.

Keywords: Wiki, e-gallery, e-learning

1 INTRODUCTION

Studio-based design projects, traditionally a part of visual arts-based design courses, are increasingly being introduced as part of engineering and technology-based design programmes. Such projects are integral to problem-based approaches such as CDIO¹ and provide opportunities for students to integrate learning from other parts of their courses into the context of a design project. This paper reports the use of a wiki-based e-gallery to support student learning on such a project.

Brief

Design the following to be suitable for mass manufacture

- a plate (dinnerware)
 - stackable or easy to store in large quantities
 - hold a drink
 - one piece
- a utensil or a set of utensils (flatware)
 - Must perform at least 2 distinct tasks (e.g. slicing & lifting, piercing & scooping)
 - be, dual purpose or multipurpose
- a vessel for drink
 - hold a suitable volume of liquid

The plate, utensil and vessel will use the same visual language to form a set.

Figure 1. Project Brief

The overall structure of the project is given in Figure 2. It can be seen that the project starts with the students experiencing the problem by eating a buffet using a variety of unusual tools such as

¹ CDIO, Conceive-Design-Implement-Operate (<http://www.cdio.org/>)

2 LITERATURE

Over the last twenty years hand-drawn studio activities on drawing boards have been largely replaced by computer aided design-based activities that result in digital design definitions. These activities are typically carried out in private areas on personal and laptop computers, and often in private physical spaces as opposed to studio settings where students have a wide range of opportunities for peer learning, for example, through discussion and evaluation of each other's design ideas and developments. A consequence of this change has been that students and tutors have fewer opportunities to share early design work and influence subsequent design directions. By sharing the digital work in virtual environments, new opportunities for learning can be created. Benefits of supporting student interaction during project work are widely recognized. Rowntree (1995), for example, argues that participants are liable to learn as much from one another as from course material or from the interjections of a tutor. He notes that there is value in a process of both sharing and offering ideas to others thereby allowing ideas to be criticized and developed following peer discussion. Rowntree, describes this as interactive learning where the learners contribute to other colleagues' learning and, in the process, enhance their own learning.

Richardson (2006) reports work on the use of web-based technologies to support such sharing of work and concludes that benefits of being able to publish content to a wide audience include empowerment and an expectation that students' work will be seen and valued by others. Burrrow and Burry (2005) present the benefits of the Wiki for a visual collaborative learning space in multi-disciplinary group work where users generate clusters of page that record and present their work on a week by week basis; reported benefits include students being able to view and build on each other's thinking. Duffy (2008) discusses the potential of a wide variety of Web 2.0 technologies in facilitating socially constructed learning. Trentin (2008), also writes about the benefits of co-writing and collaborative learning. In Trentin's case study a group task is divided into sections where each section is generated by a different member of the group. Each section is peer reviewed with a view to helping the others within the group improve their own sections. In contrast, the Wiki format described in this paper does not construct a single piece of collaborative design work but if you include the reviews from peers, the final gallery can be considered a collaborative work in itself. This resource provides a shared learning space which aids collaborative learning.

JISC (2010) reports that e-portfolios can be very useful to learners. Learners used e-portfolios for a range of activities including recording meetings and action plans through to uploading photos and documenting processes. The learners reported that it opened opportunities to assist them in developing new skills. A key difference of the work reported in this paper is that design work typically includes graphical information. Barrett (2005) discusses a range of uses of e-portfolios and emphasizes the importance of making distinctions between Portfolios for Learning, Portfolios for Accountability and Portfolios for Marketing and positions them with respect to three different forms of learning model: Positivist, Constructivist, and Socio-constructivist. These are summarized as follows.

- Portfolios for Learning are usually based on the Constructivist or Socio-Constructivist model. Their primary purpose is to allow teachers and learners to assess skills, reflect upon learning, and lead to the establishment of future learning plans. Such portfolios can be generated individually or with others.
- Portfolios for Accountability follow the Positivist model. They are usually created individually and their primary purpose is to provide the basis of a summative evaluation to demonstrate levels of achievement at a particular stage.
- Portfolios for Marketing are typically create to showcase an individual's work. This does not follow a particular learning model and is more suited to the gaining of employment or other promotional purpose. As such they are generally created individually.

The learning framework described by Biggs (1989) suggests that teaching which results in deep learning involves one or more of the following elements:

- *Motivational Context* where the students are involved in setting and planning,
- *Learner Activity* such as learning by doing, reflecting on work,
- *Interaction with others* - through discussion or group work and
- having a *Well structured knowledge base* - bring in and building on students experience and knowledge.
- In this project these aspects were integrated with the four steps of Kolb's learning cycle,

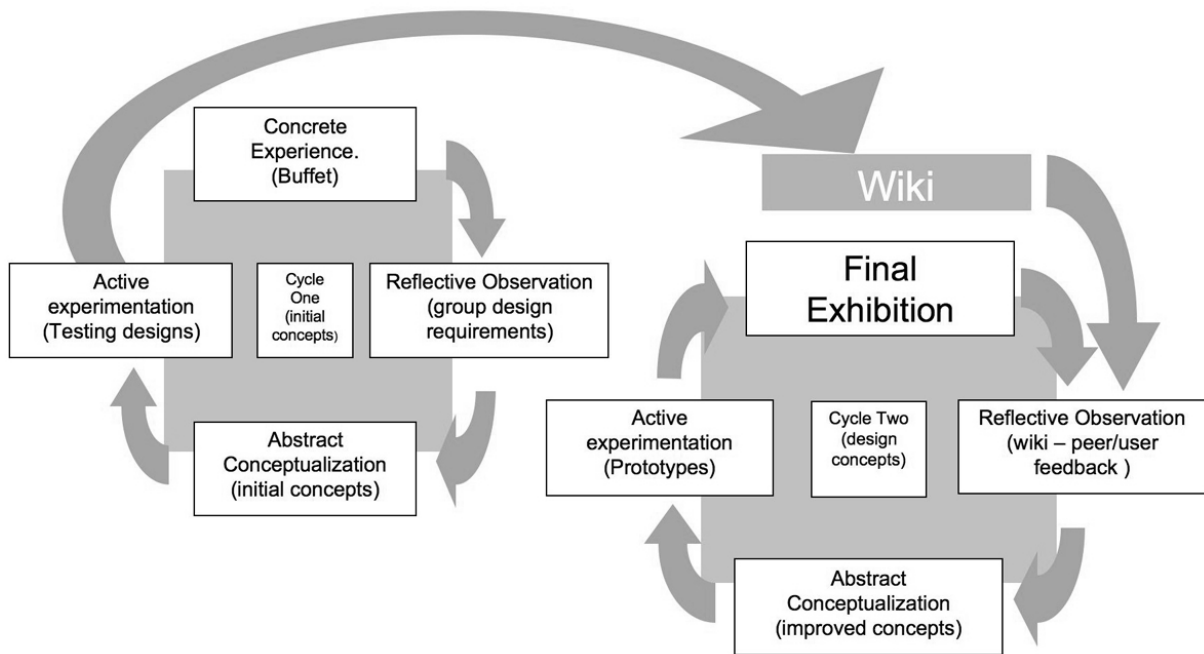


Figure 4. Reflective learning cycle adapted from Kolb

The diagram in Figure 4 is adapted from Kolb's learning cycle and shows how the students go through through two such 'learning cycles' of experience, reflection, conceptualization and experimentation during the early stages of the project. One further cycle is experienced later in the project where the final designs are developed, created and tested on users.

3 WIKI FORMAT AND STUDENT ACCESS

The e-gallery was used to provide a digital space within which students presented the results of the Abstract Conceptualization stages of their learning cycles. A Wiki was selected as it provides the facility to add both images and written comments. Comments are attached to images and attributed to authors. A four stage plan was used to control access to the Wiki. Students were arranged in small groups of around six students.

- During stage one of the Wiki, individuals within each group uploaded their images. At this stage students could only see the design work from other members of the same group and were asked to provided feedback in response to the following questions for each design.
 1. What are the strongest elements of innovative thinking within the design?
 2. What elements of the design are not clear, for example materials, context, scale, how to hold or use?
 3. A final comment, which design would you advise the student to take forward to the next stage?

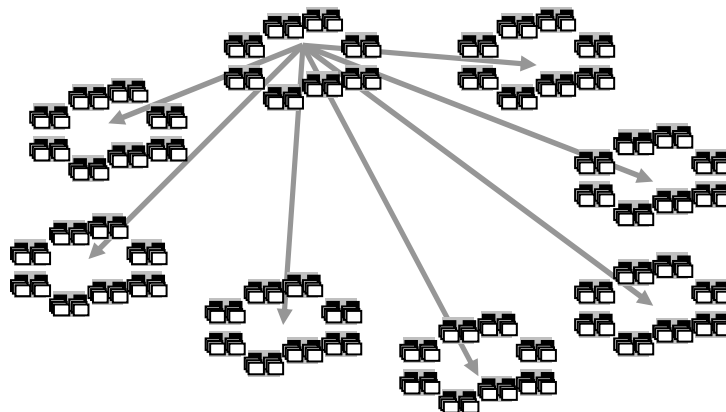


Figure 5. Open gallery illustrating how one learner from a wiki group can view the design work in other Wiki groups

- During stage two each student reviewed other group members' work by responding to two questions based on (a) the clarity of communication and (b) the innovation or novelty of designs. Comments were posted against each student's designs. This meant that each student would only be required to write ten reviews. Comments were traceable to ensure they were kept on a professional level and followed certain rules or 'netiquette'.
- In stage three the tutor provided feedback below the student comments.
- Finally, in Stage four, the whole gallery was opened so that every student could view all the other students' design work. This open access also allowed participants to read all the written comments provided by other students and feedback provided by the tutor.

Figure 5 shows a diagrammatic interpretation of the wiki structure with each student having access to 40 other students designs.

4 RESULTS

Results obtained from 20 learners regarding their experience of the Wiki are given in Figure 6. It can be seen that Motivation scored very highly with 100% agreeing or agreeing strongly that the Wiki motivated them to develop concepts early in the project. In written feedback, students also reported that they had been motivated to produce a high standard of work. For example two comments responding to the question asking what was useful about the Wiki format were "Knowing that everyone was going to see my work made me work harder", and "Trying to make sure my sketch work was at a good standard". All the respondents either agreed or agreed strongly with the statement that "Other students seeing my work motivated me to produce high quality work."

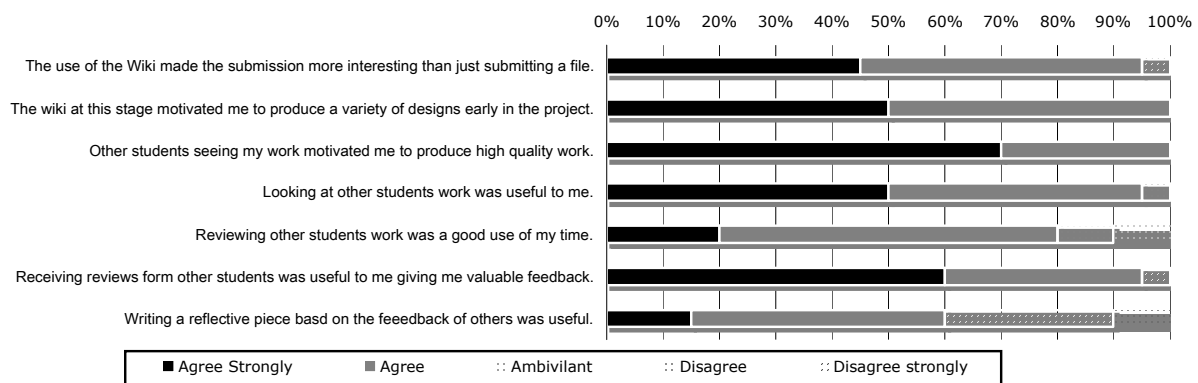


Figure 6. Results obtained from 20 learners following their experience of the Wiki

Other comments of note were, "It was good to see everyone else's work as we have never done that before" and, "I found it interesting to see others work and I think I will use some of the methods seen."

5 DISCUSSION

Student responses indicated that the Wiki style presentations motivated them to produce not only a variety of designs but high quality work. Responses were, on the whole, very positive indicating a strong acceptance of the Wiki format. Results show that the opportunity to view other students work was deemed very valuable by the students. Although the students did not all agree that reviewing other students was a good use of their time, they very much valued the comments from other students. The project was designed so that reflective practices are early in the project to provide the opportunity for the students to apply any learning later in a module.

Sharing work of any sort increases the opportunity for intentional or accidental plagiarism. These risks were minimised in the following ways. Innovation was assessed in the early stages of the project when work was private and before the Wiki was opened to all. Communication of ideas rather than the innovation within them was assessed in the latter stages. Design process was assessed alongside the presentation work in sketchbooks created documenting the development stages of each project making ideas traceable. Most importantly asking the students to select their own users and events

generated such a variety of design problems that each project was to a large degree unique. Through the act of sharing and publishing design work the Wiki also provides opportunities for students to cite each others work.

6 FUTURE DEVELOPMENTS

As an online gallery space the Wiki has its limitations and at time is clunky in operation. For example, although it was possible to include images the system is not the best format for accurately controlling the graphical layout of a combination of text and images. It is also not easy to jump from one wiki submission to another. A more efficient and more easily browsable e-studio or e-gallery space would support the learners to make more use of others work. If browsing could have the same visual fluency as software such as iTunes an e-gallery then we would expect to see increased interactivity between students. Such an e-gallery could operate as an e-studio where work in progress is posted through the project rather than just in the early stages. Having established the format within the project it could be used for the remainder of the project to even include the final exhibition.

As discussed the Wiki was divided into sections allowing a variety of levels of access all of which was internal to the University. Further development could allow external access. Firstly the group or private level could be used as a space for collaboration or learning (e-Studio) with a section for assessment and feedback (inward facing e- gallery). A more public section (outward facing e-gallery) could be used for marketing purposes, for example of the students to prospective employers or the course to prospective students. Such an outward facing e-gallery could also be used as a way of engaging with external partners such as business or other organizations. The e-gallery could, for instance, be viewed by business people; this would allow them to participate in a live project at key stages without needing to leave their offices. Such a format would provide the opportunity for valuable feedback from professionals at regular intervals.

REFERENCES

- [1] Rowntree, D 1995 Teaching & Learning online: a correspondence education for the 21st Century?, *British Journal of Educational Technology*, 26 (3), pp205-215.
- [2] Richardson, W. *Blogs, wikis, podcasts, and other powerful web tools for classrooms*. 2006. Corwin Press,
- [3] Burrow, A. Burry, J. 2006. *Working with Wiki, by Design*. John Wiley & Sons Ltd. P98-99
- [4] Duffy, P. 2008. Engaging the YouTube Google-Eyed generation: Strategies for Using Web 2.0 in Teaching and Learning. *The Electronic Journal of e-Learning* Volume 6 Issue 2 pp119-130 and online www.ejel.org.
- [5] Trentin, G. 2009, Using a wiki to evaluate individual contribution to a collaborative learning project. *Journal of Computer Assisted Learning*, 25, 43-55.
- [6] JISC. 2010. "e-Portfolios can really make a difference" [online]. [Accessed May 2010]. Available from <http://www.jisc.ac.uk/whatwedo/programmes/edistributed/regionalstories/epistle>
- [7] Barrett, H. 2005. Researching Electronic Portfolios and Learner Engagement. *The Reflect Initiative*. [online]. [Accessed May 2010]. Available from <http://electronicportfolios.org/>
- [8] Biggs, J. B. (1989). Approaches to the enhancement of tertiary teaching. *Higher Education Research and Development*, 8(1), 7-25.
- [9] Kolb, D. (1984). *Experiential learning: experience as the source of learning and development*.. Englewood Cliffs, New Jersey: Prentice Hall.
- [10] University of Leeds Plagiarism Website. <http://www.lts.leeds.ac.uk/plagiarism/design.php> Accessed 22/02/2011.