Supporting Fragility in Distance Design Education

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Abstract. This paper outlines work in progress that seeks to support and develop online distance design education for adult learners. At the core of this paper is the belief that design thinking is fragile and the systems we create to support design thinking are fragile. This has important implications for those seeking to implement immersive environments for teaching and learning in disciplines such as engineering, product design, environment design and architecture. This paper suggests we need to look backwards in order to look forwards; that by examining the characteristics of the traditional ‘atelier’ model of art and design education we might observe clues to a framework of teaching and learning in design that can embrace the opportunities presented by new digital technologies. The paper focuses on the use of Second Life as a component of a wider virtual design atelier and explores how Second Life might potentially offers a means of addressing fragile collaborative learning.

Keywords. Design; atelier; ARCHI21; education.

ON FRAGILITY
Creating online environments for design learning is not new but constructing effective virtual shared spaces that are conducive to the essential co-existence of generative, analytic and synthetic thinking processes for groups of design students is still at the experimental end of the design pedagogy spectrum. The Open University in the UK is particularly interested in this because its mission focuses on distance education for part-time, and increasingly full-time, learners of all ages. This is a broad community of learners which displays very different characteristics to a typical undergraduate cohort in a traditional university. Frequently such learners are returning to education to develop skills to improve career prospects. They may not be experienced, confident or skilled learners. Those studying part-time must fit education around the demands of full-time employment as well as normal family duties. To compound
all this their learning takes place in their own homes or places of work, remote from the tutors and their fellow students. The makes for a very fragile learning experience and its one of the reasons why few other universities have attempted to follow the Open University lead in opening up learning in the broadest public arena. This might not have been noteworthy outside of the world of distance, adult, part-time education were it not for the fact that the university sector worldwide is experiencing pressures towards radical change. There are pressures to reduce costs, improve learning, increase the relevance of their curricula, foster a more enjoyable learning experience and penetrate new markets. Such pressures have stimulated all universities to explore new models of teaching and learning and the new learningscape that has been collectively created has exposed a vital fragility.

In this context, design education can be seen as particularly fragile. The traditional model for undergraduate design education in disciplines as varied as graphic communication, interaction design and architecture has its roots in the ‘atelier’ approach to learning and teaching. An atelier is partly about physical resources such as a shared studio space but it’s also a philosophy of engagement – the notion of learners and teachers journeying together. Its roots can be found in various European cities in the seventeenth and eighteenth centuries when apprentice painters or sculptors learnt their trade from a master artist or craftsperson but its development continued and institutions such as The Bauhaus formalised the democracy of learners and teachers co-journeying. In his keynote presentation at the UK’s OpenLearn conference, John Seeley Brown [2] used the term ‘atelier’ to characterise an emerging form of learning and teaching based on social networks, a distinct participatory approach by learners and teachers and pedagogy rooted in practice. Seeley Brown drew on his experience in architecture education but many in the parent domain of design education will recognise the well-established and powerful approach offered by the atelier. Its educational qualities have attracted the attention of many distinguished researchers including Donald Schön (1988).

Many recent authors on design education have sought to reveal the cognitive capacity underpinning an essentially practical subject and leading design practitioners such as IDEO’s Tim Brown [1] have promoted the notion of ‘design thinking’. The thinking skills of designers have been shown to be just as important, and perhaps more important, than the physical skills of designing. This is particularly important for those universities such as the Open University whose mission is to allow students to develop skills and knowledge that are highly transferable to the needs of students and employers. Indeed, the OU has a first-level course titled ‘Design Thinking’. Developing design thinking and combining it with knowledge of the principles of design practice and skills with tools and approaches is challenging. At the core of this challenge is the fragile nature of design learning.

For most people their potential for design thinking needs nurturing and encouragement. Creativity is easily suppressed and it requires media for expression and communication between participants. It is highly social requiring interaction of a richer sort than many other disciplines of study. We need to recognise its fragility in the creation of online learning environments for design. The twentieth century saw academies, colleges and universities worldwide developing sophisticated systems of studio, workshop, lecture and tutorials to foster effective design learning. The twenty-first century presents new pressures on teaching resources but it also offers new opportunities for innovative and cost effective approaches to foster design thinking. However, the environments created for remote designing and collaborative learning have themselves been fragile. The atelier model of teaching and learning potentially offers some clues to achieving robust strategies and environments through new technologies.

The following sections introduce two projects that sought to develop teaching that acknowledged the fragile nature of design learning. This paper focuses on the role of immersive environments as a component of a modern virtual atelier.
SECOND LIFE IN ATELIER-D

In 2009-10 the authors of this paper were part of a project to bring the spirit of the atelier into the twenty-first century. The project was titled ‘Achieving Transformation, Enhanced Learning and Innovation through Education Resources in Design (ATELIER-D) and it was funded by the UK’s Joint Information Systems Committee (JISC). The ATELIER-D project took characteristics of the historical model of the atelier and used this to create a modern and relevant framework for an online environment for teaching and learning. This project built on the notion of a virtual design studio (Maher, 1999) combining new and commercially available computer-based tools to create powerful learning and teaching environments. The project consisted of experiments (called ‘course delivery innovations’ or CDIs) with six separate tools and three longer studies (programme delivery innovations or PDIs) of tool combinations (see Figure 1). Some of the findings, particularly those concerning combinations of tools in a virtual atelier, found application in new design modules such as Design

Figure 1
Diagram of the relationship of component parts of the ATELIER-D project
Thinking and, more widely, the work supports development of the undergraduate degree programme in Design and Innovation at the Open University.

Underpinning the studies with students were some formative characteristics that guided the bridge between a traditional atelier and a virtual one: An atelier is a space for coming into direct contact with expertise, a hub from which to make external forays, a zone for exploring and experimenting, and a home for peer group interaction. Essentially it’s a friendly but challenging place for exposure to the realities of the professional world to come. It’s these characteristics that are fugitive and fragile. They are easily suppressed or destroyed and one of the key roles of those who manage such environments is to monitor the social interaction of the learners, their engagement with the prescribed tools and their participation in activities.

**Collaborative designing in Second Life**

One component of the ATELIER-D project sought to explore the re-creation of the physical space of the design studio and workshop in a virtual world called Second Life (SL) (www.secondlife.com). It aimed to generate knowledge about the value of virtual worlds for supporting design learning, creative design thinking and collaboration. It involved five one-hour sessions of collaborative design in SecondLife. These sessions took place on five evenings between 1st and 8th July 2009. Participants were recruited from the Open University’s Level 2 course: Design and Designing (T211). Participant numbers varied between 5 and 8 over the five sessions and had different levels of expertise in SL. Three members of academic staff supported the study as participant observers. The study created a photo record of the outputs of the five sessions plus some short video sequences of group design work. Some supplementary data in the form of short video and audio sequences was also available but it proved impossible to record the whole of every one-hour session and participate in the study from any one computer. At the end of the sessions participants were asked to complete a questionnaire on their experience. Additionally the evaluation is informed by reflection from the three leaders of the study.

![Figure 2](Screen shot of one example of collaborative building in Second Life)
Some of the activities took place in a ‘sandpit’ space owned by the Open University but permitting public access. Other activities took place in a private space (sandbox) created by the OU. Each session was guided by a specific design brief, intended to create a strong design ethos to the events. These were circulated immediately prior to each session so participants had little time to work up ideas before the session. The first two sessions were intended as SL familiarisation (e.g. flying, communicating, teleporting and building), so the design briefs were deliberately open and exploratory. They sought to introduce students to some simple individual and shared design tasks. The three sessions that followed involved participants in increasingly complex situations for online collaborative working. Session 3 asked participants to construct a basic wall seat, Session 4 asked participants to create concepts for sculptural seating and to comment on the designs that others were creating in the shared virtual world. Session 5 asked participants to collaboratively build designs for a trophy (Figure 2). Thus, each session made increasingly complex demands on participants to communicate, to negotiate activity and to share innovation and idea development.

Evaluation

In some important respects shared object building in a virtual world is conceptually different to that in face-to-face working in a real-world space. Similarly teleporting and flying provides both distractions and opportunities for those new to SL. Public access to the work area (sandpit) did not give rise to problems in this study but it was helpful to have access to one of the Open University’s private areas for collaborative object building. Using this, the group could guarantee an uninterrupted session.

It was initially hoped that text chat might adequately support the collaborative tasks but it became clear from Session 1 that the ability for participants to use voice was essential. Partly this supported problem solving and partly is facilitated better collaborative designing. Participants felt they didn’t maximise their contribution in the collaborative design sessions because they didn’t have sufficient knowledge of how to control their avatar. While the inclusion of orientation tutorials was essential students requested more time to become familiar with the virtual environment and to practice basic skills. In these mixed ability groups the participants played a vital role in helping each other. The study reported that any use of SL as part of a proposed online atelier must include a generous period of training and familiarisation.

There needs to be a clear inducement to collaboration – at times the participants worked collectively but as individuals with little communication towards shared understandings. It seems important to build-in time for participants to get to know each other (e.g. a group ride on a ‘magic carpet’ was successful for this because the focus was on socialising not on controlling one’s avatar). In some ways, SL is ideal for constructing temporary working environments. It offers a fast and effective means of recreating a studio-like space proving defined spaces for private work and collaborative work. It supports the essential need for design students to exhibit completed work and, just as importantly, work in progress. The wide range of types of assistance required and the limited technical support available to this project suggested that the use of SL might be difficult to scale up across large and diverse student cohorts. For students competent in using modern computer aided design (CAD) tools the building tools in SL might lack functionality.

The next section presents a second project that further explored the idea of using Second Life for supporting collaborative designing between students.

SECOND LIFE IN ARCHI21

ARCHI 21 is a two-year project concerned with content and language integrated learning (CLIL) in architectural and design based education and practice. The work, funded by the EU Lifelong Learning programme (Key Activity 2: Languages), involves several European universities and is led by the École
nationale supérieure d’architecture Paris-Malaquais. The project allows the authors to build on the foundation established by the ATTELIER-D project between 2008 and 2010.

The work reported here forms a contribution by the team from the Open University in April 2011 as part of ARCHI21’s work package 4. The study was structured in a similar way to the ATTELIER-D work. It invited students to take part in a sequence of studies that progressively engaged them in collaborative design in Second Life. The study was divided into six sessions. Five of these were carried out in-world at the OU’s own SL island, while one session combined SL with the use of conferencing tool FlashMeeting (FM) that was developed by the Open University. The study was supported by the ARCHI21 researchers, a language consultant (mediator) and a SL consultant.

This study focused on the development of language and communicative skills associated with understanding, generating and presenting a design brief and collaboratively implementing this brief in SL. With the eCAADe 2011 conference in mind the concept of fragility was used as an underlying theme for the development of the design briefs during the study. 17 student participants were involved (9 native and 8 non-native English speakers) and all were recruited from the design modules offered by the OU. Also appearing in world were facilitators (SL experts, design staff), a language mediator and occasional visitors. A selection of participants was made according to availability for the set dates and their language profile. Having learned about the importance of voice communication, students were asked to test their access to SL and that their equipment, particularly the headsets and settings for voice communication, was functioning before joining the study. They were also required to fill in a pre-study questionnaire assessing their design language competence. Students had access to additional supporting materials such as information on getting started in SL, an introduction to design briefs, and a short summary of building in SL.
Session 1 was dedicated to introductions, becoming familiar with the Second Life environment and solving technical problems. In Session 2 Students were invited to engage in a discussion with the aim of speculating on what might be the design brief behind ‘an egg’. The egg was chosen because it offered an unusual context for reflecting on design briefs and because it has obvious associations with fragility. Students were encouraged to think about different aspects of fragility and how this might influence a design brief. The focus was on informal language and ability to understand and use in discussion technical terms of the design brief to describe objects. In Session 3 students were invited to work in groups in order to build an object in response to a given brief. Following on from the previous session, and the issue of fragility, this brief required students to build a chair for the children’s storybook character Humpty Dumpty. The focus was on technical language as well as communication during collaborative design. In Session 4 students were invited to work in groups using FM. Each group worked to define a new design brief for an object, or system that embraces the notion of fragility (e.g. in terms of environment, aesthetics, function/performance, experience). The focus was on verbal and textual communication in ideation. In Session 5 participants swapped their briefs from Session 4 and worked to the brief generated by another group in SL. They were tasked with developing responses that satisfied the brief they had been given. In the final session students worked together in SL, and in their respective groups, in order to develop a short (five minute) verbal presentations of their interpretation of the design brief they had been given. The focus was on formal presentation skills.

While 17 students were recruited the maximum number attending for any one SL session was 13. It’s an indication of the difficulty of finding meeting times that suit everyone in a student cohort. The group size was manageable but one language mediator was not enough because the task involved observing, interacting and summarizing language features that were used in the sessions. Outputs from the mediator facilitated the creation of examples of successful communication and these were sent out to participants via email. The input of the facilitators structured discussions and provoked ideas for new directions of a discussion. There were some technical problems associated with SL Viewer 2. The facilitators needed to guide the sessions very directly in order to keep to the planned time schedules but even with a clear time plan, each session took a significant proportion of the allocated time to get down to the set collaborative task. This was mainly due to persisting technical problems with sound and internet connection speed. The only exception to this was the final session where the presentations began promptly. Attempting to solve every technical problem of every participant would leave no time for the group work.

Reflection on the ARCH21 study

Technical problems were a major factor in the experience of all participants. In the induction session half the students had sound problems and this affected the quality of the induction to building. There were also problems with permissions to edit objects created by others. At times facilitators resorted to Skype to discuss problems being experienced concurrently in SL. Written communication can provide a useful channel but chat became very crowded with parallel discussions, typing in SL chat can be tiresome and some novices failed to find instant messaging. Audio and chat were used to introduce building in SL but some participants found this confusing. Approximately half of the students got to grips with basic building techniques quickly. The problems decreased as the sessions progressed.

Participants found the session that explored the possible design brief for an egg stimulating but technical problems meant that communication patterns were erratic and out of sequence. The group reflected on the properties of eggs as a driver for speculating on what a hypothetical design brief for an egg might be. At the end of the session the facilitators
were able to bring out clear teaching points about how an object can reveal features of the brief that may have initiated it.

Session 2 on designing a seat for Humpty Dump-ty introduced students to collaborative ideation and building. It was immediately noticeable how much the students learnt by talking to each other. This was evident even before the building session really started when one student helped another in completing some questions about the concept of fragility.

The session where participants met in FM as well as SL was ambitious for novices and it introduced a whiteboard into the tool options. Students were split into three smaller groups of 4-5 each to discuss the concept of ‘fragility’ creating attributes, synonyms etc. Facilitators steered the discussion from general to more concrete problems related to fragility. Students engaged in the brainstorming phase but could not, as a group, focus on one theme. The whiteboard was not used as anticipated and a direction for one group brief had to be imposed by a facilitator. Another group did not adequately conclude this discussion in time and was late returning to SL, which weakened the social coherence of the larger group.

The fourth session invited students to use their SL building skills to respond to a brief created by another group. The use of representations to support creative thinking and communication was stimulating. Understandably, given the focus of the project, verbal discussion focused on intended meanings of the various briefs as well as explaining the interpretations imposed. In the conclusion to this session, students really wanted to discuss the overall concept of SL in design education rather than focus on the local task in hand. Finally, the facilitators took snapshots of designs created in that session in SL, which were mounted on panels for presentation in the final session.

In the final session the participants used their display panels to practice and then deliver short verbal presentations (see Figure 4). Students had to negotiate who would convey each part of the presentation. Language support took the form of advice.
on how to deliver material (e.g. speed and content). Each presentation was followed by questions and applause with a final summary of language matters from the language facilitator. The session ended with an in-world celebratory disco.

THE DIRECTION FOR ANALYSIS

The notes presented in this paper provide a snapshot of one small part of the ARCHI21 project conducted at the Open University. The work has generated video data awaiting analysis plus qualitative data in the form of notes from the language mediator, the technical support and the staff facilitators. There are about 20 hours of recorded data, which offers a rich ground but also challenges for analysis. Summarising and sampling is being explored to overcome the need to generate and examine full transcripts for every session. Conversation Analysis would then be applied to the identified key samples within each session following four threads of analysis:

1. Uncertainty
   Uncertainty is inherent in design activity. This makes many design processes fragile. It is also a driver in designing that is urging designers to move to more certain propositions. We were able to observe expressions of uncertainty in conversations in SL. The level of uncertainty in language and the use of hedge words can provide an indicator of confidence and progression in design.

2. Repetition and adoption of language
   If the data provides evidence that students repeat and adopt the tutors’ design language, applying it when they communicate their own design activity and outputs, then this might reveal how Second Life can support the type of learning that the traditional face-to-face studio experience has done so well.

3. Building knowledge in conversation
   This concerns leading students to a higher level of understanding and abstraction of knowledge through conversation, i.e. initiation response cycle. We are exploring whether certain characteristics in discourse reveal distinct upward steps or insights and contrasting experiential and conversational knowledge observed through interactions.

4. Building points of view
   The potential for this is seen particularly in the last two sessions. There are many styles and features of establishing a point of view and developing this through discussion. An analysis of the argumentation patterns in discourse could reveal how students develop a supportive argument for their design ideas.

And, of course we have the participants’ questionnaires to assist in a triangulation of such analysis.

END NOTE

This paper has reflected on two programmes of research, the ATELIER-D project in 2009-10 and the first phase of the ARCHI21 project in 2011. It suggests that virtual environments such as Second Life might provide a core component of an online atelier. The traditional atelier model fostered the type of enculturation into practice that modern schemes for distributed situated learning are just coming to understand. The atelier model has proved particularly effective for developing sensitivities to those classic but fugitive elements of design education such as problem finding and problem solving, working effectively as part of a team, sensitivity to market opportunities and the ability to generate innovation. However, the traditional atelier has had a significant period during which it developed its robustness. For example, incorporating systems to encourage participation, groupings that ensure support, fostering creativity and the constructive value of failure, stages of learning that allow learners, as well as teachers, to assess needs and progress, methods of assessment that are transparent.
and skills that are valued and relevant. Few of today’s environments for distance design learning exhibit more than a few of these characteristics. This is why they are fragile.

Designing today is a complex collaborative process and preparing students for professional practice across a spectrum of potential careers is difficult. The skills and knowledge are broad and many of these need nurturing and fostering in safe, supportive spaces with appropriate interaction between peers and tutors. Verbal communication is enhanced where visual cues are present and visual artefacts are particularly important in fostering communication and learning. It is all too easy to compose a fragile online environment that consists of the component parts of an atelier. It is much harder to integrate the tools in a robust way that acknowledges the fragile nature of the teaching and learning in design.

REFERENCES