
A Virtual World Environment for Group Work

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This paper seeks to show that virtual worlds provide a useful addition to the use of computer mediated learning tools. We discuss the underlying educational context and link this to the properties of virtual worlds and, in particular, that of Second Life. We report on the progress of a project for developing group work which seeks to link affordances in the environment to learning outcomes and employs a socially-situated, constructivist, pedagogical framework.

Keywords Virtual world, constructivist education, group work, communities of practice

1. Current Educational Practice

Current practice in Higher Education is moving away from didactic content delivery, the transfer of discrete, abstract, decontextualised concepts [1], towards constructionist, student-centred models with increasing emphasis on the skills that support independent, self-motivated learning. This trend [2] is increasingly facilitated by use of dedicated educational software to create virtual learning environments (VLEs). As well as providing access to online materials these support collaborative learning by providing areas where students can comment, contribute and share their learning.

A recent detailed survey of blended e-learning by the Higher Education Academy [3] identified three ways of using technology to support teaching in a blended learning environment:

1. 'Traditional' (most common mode) - used to provide access to lecture notes and supplementary material.
2. 'Transformative' (innovative and relatively rare) – where technology is used to radically change course design with emphasis on interaction and communication. Anglia Ruskin's Ultraversity degree in Learning Technology Research [4] provides a good example of this type of course where the integration of the practice of the student is facilitated by technology.
3. 'Holistic' (emerging) – where students exercise an informed choice over technology provided by the institution (e.g. dedicated VLE) or from external sources (e.g. online web based services). Learning from the institution, from practice and from experience is viewed as a coherent whole that requires technological support before, during and after enrolment on a particular course of study.

These modes of delivery support different types of learning / educational modes. Traditional lectures and seminars tend to focus on an associative learning mode where concepts are explained and then students apply these to illustrative problems to build up a body of knowledge.

The emphasis of a transformative mode of delivery on communication lends itself to a constructionist model where learning is achieved by exploration, reflection and collaboration. The student applies their existing knowledge and experience to integrate new concepts in a personal way – i.e. using their 'take' on the situation. Social constructivism exports this concept to the ability of a group of collaborating individuals to create a shared model of knowledge as well as contributing to individual learning.

The holistic mode takes a wider, longer view that is appropriate to situative learning. Students develop through participation in communities of practice, typically within a real world situation for professional development. The situation provides the context for observation, reflection and opportunities for mentor-

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ship, both to help the student and for the student to share their knowledge with others. The real world, ongoing nature of this learning mode makes it an inappropriate application for the traditional VLE which is only provided for the duration of a course. However, alternative providers external to the organisation can provide suitable tools [5] that may be used before and endure beyond the enrolment for a course.

The 'virtual worlds for group work project' presented in this paper has elements of each of these delivery and pedagogic views but is grounded in the transformative / constructivist mode. However, there are elements in this project that contribute to the holistic view and it is hoped that progress can be made towards a generic situative model suitable for learning activities both within institutions and ongoing professional development. Some of the issues of using a virtual world for transferable skills are outlined in [6].

2. Online Virtual Worlds for Education

Virtual worlds have been used in educational research since the early 1990s [7] but it is only recently that the communication and hardware technology has reached the level where they can be made available to a mass market. Online gaming environments, (Massively Multiple Online Role Playing Games - MMORPGs) such as World of War Craft have led the way in themed virtual worlds with sophisticated graphics, interaction and a narrative that allows significant contributions by individuals or groups of users.

Second Life (SL) [8] is a 3-D online virtual world where, contrary to the themed MMORPGs the content is built and owned by its users. It provides tools and guidance for manipulating the environment; allowing action scripting, object construction and an economy that supports the creation of virtual businesses. Users used to the strongly themed role playing games can find that SL lacks depth and detail but it does allow a closer relationship between the virtual (SL) and real (RL) worlds. The activities of in-world commerce are significant enough to be covered by Business week [9] and are measured in hundreds of thousands of US dollars with the in-world currency the Linden dollar freely convertible to US dollars. Real world concerns from Media (BBC, Channel 4, Reuters) commercial (Nike, Amazon, IBM) and a growing number of universities have a presence in-world. SL provides a campus registration to assist Universities to establish virtual classes, campus constructs, and student enrolment.

Some of the educational activities in SL tend to follow a traditional class based approach with Universities such as Harvard and San Diego having their own virtual campus with virtual lectures and demonstrations. Links to these and other SL educational resources can be found on the SimTeach site [10]. While these activities provide advantages for distance learning this does not fully exploit the intrinsic properties of the virtual world. A better model to use for learning in SL would be a field trip where some tasks may be outlined but the detailed implementation is down to the student, their co-students, resources they find and other residents with whom they interact. New Media Consultants have opened a virtual campus where SL is used to support a range of educational activities [11].

3. Virtual Worlds Group Project

3.1 Aims

Anglia Ruskin University is funding this research project from the University Centre for Learning and Teaching (UCLT) with the specific brief to extend understanding and inform teaching practice. Previous studies into virtual worlds [12] have provided important insights into the pedagogical implications of these systems. This project will build on, and contribute to, the on going evaluation of such systems and start the process of establishing techniques for their effective use in a computer science curriculum. We have chosen the area of group work as an initial target as it highlights the collaborative, collective nature

of Second Life itself and may benefit from the greater projection of personality afforded by the interface when compared to other online environments. The core learning outcomes we seek to promote are:-

- Interact effectively with others
- Maintain co-operative working relationships
- Play a useful role in group/ team activities
- Feel confident in a group setting
- Take a leadership role when asked to do so.

Within the context of the SL environment the situative model of learning seems particularly appropriate to development of group skills. The shared experience, and group targets set by the project, will help develop communities of practice. In observing the reactions and attitudes of new users to the SL environment we have seen other key learning elements of observation, reflection, mentorship and participation in community activities. In this project we hope to provide evidence of this process and to develop techniques and guidelines on how best to design learning activities to support it.

3.2 Methodology

The research will be carried out as an evaluative case study using material recorded from the interactions of students carrying out a set of tasks. The core analysis methodology will be based on affordance theory [13] which seeks to relate features (affordances) of a system, as perceived by the user, to actions and behaviour that it supports. We will measure the system in terms of affordances and constraints as they impact on the learning outcomes of the tasks. At a finer level of detail, common behaviours used to attain sub-goals will be identified, classified and mapped to affordances.

The underlying constructivist pedagogical perspective implies that task completion is not an adequate measure on its own. We will also measure how the students develop in the sophistication of their interactions. To guide this more subjective evaluation we will map Gilly Salmon's [14] five stage model, developed for e-learning environments, to types of communication activity seen in the virtual world. The core steps are as follows:

- Access and motivation
- Online socialisation
- Information exchange
- Knowledge construction
- Development

We will be looking for signs that the environment helps to support social interaction by looking for positive or negative influences on Wenger's principles for communities of practice [15].

3.3 Experimental design

Students will be guided through a series of tasks that start as orientation exercises and become increasingly complex and open ended. In keeping with the desire to develop autonomous, self motivated learners these activities will be designed for self-completion rather than as part of an organised class. An in-world mentor will be available for guidance and to help motivate the participants. Additionally, students will be able to call on the considerable in-world resources provided to help new residents in SL. An ancillary role for the mentor will be to observe the interaction of the participants and their use of the facilities provided by the environment. However, as there are no restrictions on when students may enter and use the system, the mentor will not be expected to be on hand at all times. Supporting the in-world activities will be face to face tutorial sessions to provide a broad explanation of aims of the project. Additionally, the Moodle VLE will be used to supply documents, explanations, instructions links and online activities and more importantly provide journal facilities for recording and reflection. Feedback from students will be recorded in a number of ways -

- Snapshot photographs uploaded to 'snapzilla' (the SL linked online photo repository).
- Moodle forums for discussions about in-world experiences.
- Moodle journals for more detailed accounts and reflection.
- In world recording devices worn and controlled by students to capture IM conversations.
- Logbooks and records made as part of the tasks.
- Use of the SL video recording system (Machinima) to provide diaries of activities.

3.4 Preliminary Results

One of the key questions we seek to shed light on is the issue of engagement. Students quickly get used to even the most exotic environments and in order to hold their attention there must be a correspondence between the technology and what they perceive as being useful to them [16]. In our own practice [17] we have identified five key points that affect engagement in the use of discussion groups, which we intend to follow up in the virtual worlds project, as follows:

1. Sense of fun and novelty insufficient to motivate use of technology.
2. Assessment (necessity) a strong motivation for using technology.
3. Structured navigation preferred by less confident students.
4. Match between technology and task.
5. Perceived value of activity.

These features seem to be echoed in a preliminary induction session with a group of computer literate (level 3 undergraduate computer science) students. During the session eight students were introduced to SL for the first time and given an instruction sheet that enabled them to get create an avatar and start to interact with the environment. There were two project members on hand in the room and online, with one of these being the key online mentor. Beyond the induction phase the session was deliberately unstructured to see what the 'base' unguided behaviour would be – i.e. what would people make of the environment. Within a short time it was clear that there would be no standard behaviour but four core types of behaviour could identified, which reinforced anecdotal accounts of attitudes to in-world experiences:

- Superficial - user does not engage and does not find the SL environment interesting.
- Realistic – user acts and behaves in SL as they would in RL, regards other avatars as other people in social situations.
- Empowered – user acts in SL as they would in RL but feels empowered to be more adventurous in initialting activity and social situations.
- Fantastic – user regards SL as a game where other avatars have little connection to real people, bold social behaviour, with less social responsibility than RL.

These behaviours can be related to the underlying character and learning styles of the student. For example the Honey and Mundford [18] classification of activist, reflector, pragmatist and theorist can be linked to form a conceptual grid as shown in Table 1.

Table 1 Showing a possible connections between learning style and interaction style in SL

	Superficial	Realistic	Empowered	Fantastic
Theorist	•			
Reflector		•		
Pragmatist			•	
Activist				•

Although it is possible to be a ‘Fantastic Theorist’ the dots in the boxes indicate the most likely combinations. We do not believe that these classifications are fixed and may change as the user gains experience. While as yet lacking concrete evidence for this model it does give a clue to the design of learning activities. Firstly, it is possible that an in-world experience may be more attractive to activist learners than class or VLE based exercises but this may be less attractive to theorist learners. Secondly, learning activities can be targeted to extend learning and interactive styles.

4. Summary

Experience, research and preliminary findings all point to the need to devise carefully planned learning activities to produce the desired learning outcomes. The sophistication of the environment makes this a more, rather than less, challenging task, as does the wider range of possible styles of interaction in a virtual world compared to classroom or traditional VLEs. This project seeks to identify affordances within the virtual world environment for facilitating group work and relate these to pragmatic guidance grounded in educational theory.

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