A Virtual World Environment for Group Work

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Abstract

This project sought to show that a virtual world can provide a useful addition to the use of computer mediated learning tools. In this papwer 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. We present our findings and guidelines that promote independent cooperative learning within the virtual world environment.

1. Current Educational Practice

Current practice in Higher Education is moving away from didactic content delivery, the transfer of discrete, abstract concepts (Goodyear 2002), towards constructionist, student-centred models with increasing emphasis on the skills that support independent, self-motivated learning. This trend (Cullen et al 2002) 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 (Sharpe et al 2006) identified different ways of using technology to support teaching in a blended learning environment. 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.

In the constructionist model 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 'virtual worlds for group work project' presented in this paper has elements of both of these pedagogic views but is grounded in the constructivist mode. It is hoped that virtual worlds can provide a wider range of teaching and learning styles and in particular support a model suitable for learning activities both within institutions and for ongoing professional development (Hobbs et al 2006).

2. Online Virtual Worlds for Education

Virtual worlds have been used in educational research since the early 1990s (Hughes and Moshell 1997) 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) (Linden Research 2006) 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 with experience of 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 (Hof 2006) 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 website (SimTech 2006). New Media Consultants have opened a virtual campus where SL is used to support a range of educational activities (New Media Consultants 2006). 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.

3. Virtual Worlds Group Work Project

Anglia Ruskin University funded 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 (Dickey 2005) have provided important insights into the pedagogical implications of these systems. This project builds on, and contributes to, the on-going evaluation of such systems and seeks to start the process of establishing techniques for their effective use. We have chosen the area of group work as an initial target as it corresponds to collaborative nature of Second Life. The core learning outcomes we sought to promote were:-

- 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, are designed to help develop independent and cooperative learning within the group. Some of the skills we want to promote are also those that are core to the nature of the environment i.e. observation, reflection, mentorship and community participation.

3.1 Methodology

The research was carried out as an evaluative case study using material recorded from the interactions of students carrying out a set of tasks. The underlying constructivist pedagogical perspective implies that task completion is not an adequate measure on its own. So we also needed to measure how the students developed in the sophistication of their interactions. To guide this more subjective evaluation we used Gilly Salmon's (Salmon 2004) five stage model, developed for e-learning environments, to types of communication activity seen in the virtual world. These steps were mapped onto tasks as outlined in table 1.

Model levels	In world Task
Access and Motivation	Registration and orientation
Socialisation	Meet and join 'ARC'
Information exchange	Choose group identity
Knowledge construction	Treasure hunt
Development	Building competition

Table 1 e-learning model levels and tasks

3.2 Project Implementation

12 students from the level 1 Computer Gaming and Animation Technology degree agreed to participate in the group work project. None of them had any experience of Second Life but all were computer literate and experienced with online game environments. Although not normally part of their studies the introduction to a virtual world and the group activities made useful contributions to their core curriculum. Prior to the start of the project a tutorial session was held on techniques for group work as part of their Personal Development Portfolio (PDP).

An online resource for the project was set up in the Moodle Virtual Learning Environment (VLE) with project documents, SL and group work related web links, News forum (only available to project leader) and discussion forum (open to all participants) details of the tasks and instructions for using SL snapshot and conversation logging. The Moodle blog system was used by students and groups to record and share their experiences.

Students were guided through a series of tasks that start as orientation exercises and become increasingly complex and open ended. The desire was to see what learning and group activities emerged naturally from the tasks and the affordances of the SL environment.

3.2.1 Project briefing

Students were told about the aims and activities of the project, provided with copies of the project outline and ethical consent forms. These detailed their responsibilities, the rewards for participation and the constraints on the use of the information gathered by the project.

3.2.2 Registration, Orientation and basic skills.

Once a student chooses an avatar they undertake 1-2 hours of individual orientation using the standard SL resources of 'Orientation Island for basic interaction skills (moving, communicating, personalising avatar etc.) and the Help Island for the introductory tutorials for building and editing objects. These areas are closed to everyone apart from newly registered users and to cope with demand there are several instances of each resource. This means that students cannot meet in world mentors nor are they guaranteed that they will even see others from their class. So this session was principally mentored in the classroom.

3.2.3 The Anglia Ruskin Computing Group

After initial orientation and basic tutorial sessions on help islands students were directed to the Anglia Ruskin Computing (ARC) group meeting point. All the groups met together and could see each other's avatars for the first time. By this time some students had already explored and brought examples of things they had found and 'showed off' the skills they had learned. Students were invited to join the ARC group which allowed them permission to build on the ARC site. Once they had joined they were able to collect a note card with the treasure hunt task details.

Figure 1 *Rus Ranger*, one of the project mentors, looking at the gathering members of the 'Anglia Ruskin Computing' (ARC)group

3.2.4 Group formation and identity

The students organised themselves into three groups of four. Each group had to choose an 'identity' and devise some visual clue in their avatar appearance. In addition they had to post a message to the blog to show that visual identity and send an email to the project leader to identify who was which avatar. Students were encouraged to fill in details in their personal profile, such as their chosen group identity but to avoid providing any identifying information such as user names or emails.

Figure 2 The Secrete Service Group - demonstrating their group avatar theme

3.2.5 Group treasure hunt

The group treasure hunt task was to locate examples of things specified on a note card. The idea was to get students to develop skills in searching, travelling and group activity. To show that they had found the item the whole group had to get a snapshot with the group and the item – for example figure 3 shows a group in jail.

Figure 3 The 'gamers guild' group together in jail.

3.4.6 Building competition

The 'ARC' group land was divided into three waterfront plots. The groups were given the brief to build a jetty for a sailboat and a lodge for the owner to relax in. These were to be judged and the best construction would win a prize. To support this activity students were directed to in-world tutorial resources and were given a workshop / tutorial session on the building and editing tools. Figure 4 shows two of the building plots side by side under construction.

Figure 4 Building task – boat house under construction

3.4.7 Feedback and Recording
Feedback from students was recorded in three ways – observation in class, individual blogs and reflective reports written shortly after the end of the activity. Evidence for activities was recoded by students using the SL snapshot tool and shared with the group by adding them to their blog. The snapshots of in-world activities were uploaded to 'snapzilla' or 'photobucket' and linked to the Moodle VLE where the individual blogs were hosted.

4 Results

The results gathered were from direct observation, both in-world, in the laboratory and from the recording activities of the participating students. We found evidence that at least some of the learning objectives we were seeking were being well supported by the environment. We also found some behaviour that we had not anticipated.

4.1 Skill and knowledge differentiation

Students quickly showed a very marked differentiation in both the expertise and type of skills learned. Within the first few hours it was clear that the majority were gaining wider and deeper skills than was necessary for the basic task completion. However, keeping them focused on the current activity was difficult and a few students did not gain sufficient skills to complete tasks on their own.

We believe the differences in skills reflect innate ability but are emphasised by using the in-world learning resources. These resources are diverse and cover a broad range of skills that require a more sophisticated learning style than a closely monitored set of class exercises. The resources make it easy to explore and extend skills but without external monitoring it is easy for a student to move on before they have learned enough. The natural propensities for a student are also emphasised by the open and autonomous learning situation. They tend to be good at what they like and like what they are good at, focusing on those things that interest them provides a positive feedback loop developing some skills at the expense of others. This was evidenced by some students becoming adept at avatar customisation but failing to pickup many building skills.

4.2 Real and virtual integration

Most of the group work was done in a laboratory where it was easy to communicate face to face as well as interacting with the environment. In other work this cohort of students would typically be talking and interacting about the exercises they had been set. So it was unsurprising that there was considerable interaction about the project tasks (and other things). However, it was surprising to see how the ability to interact in the virtual world complimented and enhanced the overall communication. Students interacted seamlessly between the real and the virtual worlds, particularly during the more complex building tasks. Discussion and communication was typically done in the classroom but demonstration, knowledge discovery and sharing were done in-world. This was an entirely un-prompted, emergent behaviour enabled by the environment.

4.3 Group working

Analysis of the reflective reporting showed that most found the experience useful and interesting. However, it was also apparent that the environment alone had little influence on the perceived success of the group. The project was not a template for training students in group working but was designed to look for the affordances of the environment that enable group activities. Table 2 shows a summary of some of the evidence that the project provided to support the skills we wish to see developed for group tasks.

Table 2 Group work goals achived

Goal	Degree	Evidence
1. Interact with others	Comprehensive	Negotiation of group theme, blog accounts
2. Co-operative working	Comprehensive	Artefacts created with contributions from all group members.
3. Role in group activities	Informal / flexible	Tasks assigned informally, one or two tended to lead.
4. Confidence	Partial – depended on engagement	Personal blogs
5. Leadership role	One main leader with domain specialists	Group typically driven by one person but sub tasks lead by others in the group.

4.4 Level and nature of engagement

Related to the use of technology for any task is the question 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 (Laurillard et al 2000). In our own practice (Brown 2006) we have identified five key points that influence engagement in the use of discussion groups, and Table 3 summarises some of the findings from the virtual world exercises.

Table 3 Level and nature of engagement

Criteria	Finding	Evidence
1. Sense of fun and novelty insufficient to motivate use of technology.	True – particularly for students used to interactive gaming technology .	Some students failed to engage beyond assessment guidelines.
2. Assessment (necessity) a strong motivation for using technology.	True – other work took precedence until linked to assessment.	Reporting and reflection linked to PDP assessment
3. Structured navigation preferred by less confident students.	Not proven – unstructured nature of task criticised by some students.	Some students ignored tasks and 'did their own thing'
4. Match between technology and task.	True – shared environment facilitated group building activity.	Groups worked in both virtual and real environments.
5. Perceived value of activity.	True – depends on engagement threshold for activity	Students carried on developing in SL beyond end of project.

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 un-structured 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 initiating 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 (1992) classification of activist, reflector, pragmatist and theorist can be linked to form a conceptual grid as shown in Table 4. The dots in the boxes indicate the most likely associated combinations. While 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.

Table 4 Showing connections between learning style and interaction in SL

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

It is probable that these attitudes change with user exposure to the environment but it is more useful to separate the innate learning characteristics from those effects that are directly related to expertise. A scale of increasingly sophisticated skills in the virtual world can provide a simple measure of confidence and experience. Monitoring the rate of and depth of skills acquisition might provide evidence for different learning styles.

5. Summary

Experience, research and preliminary findings all point to the need to devise carefully planned learning activities to produce the desired learning outcomes. Although Second life is not a magic wand it does have accordance to transformative educational goals by providing a rich environment for individual exploration. Open ended learning tasks and field trip activities can be devised. However, 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. The following list outlines some of the ways in which Second Life enables students to take more responsibility for their learning:

- Blending real and virtual - virtual online environments lend themselves to distance learning but this project shows that they can also add a new dimension to group activities which can seamlessly move from face to face to virtual.
- Task based learning – The skills needed to complete the tasks were principally learned from the virtual environment and perceived as part of the task rather than being external.
- Varied autonomous learning - students gained skills in different areas by accessing different learning resources and experiences.
- Peer to peer learning – shared environment made it easy to demonstrate applied knowledge. Students would take on a tutoring role to disseminate skills.
- Mobile group structures – the core leadership role in groups did not change but group members would lead sub-tasks where they had particular skills.

The affordances of the environment support autonomous differentiated learning which we believe provides for richer interactions than a more traditional uniform class exercise approach. Students have to identify and utilise appropriate learning resources within a diverse environment which is one of the core skills for independent learning.

5.1 Future work

Having seen the nature of the environment in a real learning situation we are now in a position to design a larger scale project to provide more detailed evidence for the effects we have seen. Second Life will provide a component to several new courses to be delivered in the 2007/2008 academic year at Anglia Ruskin University. By monitoring the acquisition of skills in the virtual environment in these, and courses without a virtual component, we hope to gather more detailed information on the transference of knowledge between students in virtual, blended and traditional environments.

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