Mashing The MUVE - A Mashup Model for Collaborative Learning in Multi-User Virtual Environments

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Abstract:

Mashup technologies offer opportunities for students to become proactive, collaborative and engaged. However the primary metaphors are asynchronous, allowing reflexive and expansive dialogue (Palloff & Pratt 1999) but limit dynamic collaborative learning. This paper will present a model being evaluated at the Open University using a mashup immersive learning environment to offer collaborative learning in a situated, constructivist context. The pilot project will be used to map pedagogy and learning outcomes. This paper will focus on the key affordances offered by the mashup technologies being developed and consider how these can be incorporated into future course design and learning strategy.

1   Introduction

1.1   Current metaphors – online and distance

Even with the advent of Web 2.0, the majority of online and distance learning metaphors are predicated on asynchronous and time-lapsed metaphors. Although most Web 2.0 technologies are located around the value of community of practice (Lave, 2001) to build shared repositories and collaborative learning, there is still no expectation that this interaction will take place in real time or involve simultaneous interaction. This can be an advantage in that it enables learners to work at a distance, in their own time and at their own pace, thus remaining better located in the zone of proximal development (Vygotsky, 1962), however it does limit the educational possibilities and the role of the teacher is also controlled by the environment.

Distance learning still remains located in an instructional, isolationist model in most cases with a central focus on the delivery of information from teacher (expert) to student (learner). It is predicated upon 'facts' and assessment is often by way of computer marked assignments (CMAs), which are usually multiple choice quizzes. This model is currently employed at the

Open University within a more blended context, where course material is delivered online in this factual paradigm and increasingly assessed with CMAs but still supported with a distance tutor. This tutor is responsible for assessing TMAs (tutor marked assignments), which still privilege information amassment over ways of thinking and engaging, although this is a recognised issue which is being addressed university wide.

1.2   New metaphors – pedagogy of teaching and learning in SL

Emerging work is beginning to identify metaphors which can be used to focus pedagogy in Multi-User Virtual Environments (MUVEs) as more and more institutions are developing a presence in commercial MUVEs such as Second Life, the 'virtual world' operated by Linden Labs. Second Life is available for adult users only, but Linden also operate 'Teen Second Life' for young people aged between 13 and 17. Bone fide educational institutions are able to obtain educational islands in this grid and staff their projects with adults, providing they have been fully police checked and cleared before being allowed to interact with the young people. One such US organisation is GlobalKids, which works with disenfranchised young people in urban areas to help them develop leadership skills 'by engaging them in socially dynamic, content-rich learning experiences.'

Clearly this mission statement meshes closely with the opportunities offered for HE learners identified at the beginning of this paper and, further to this, GlobalKids has drawn up a 'best practices' document which offers strategy and metaphor for pedagogy in this situated constructivist environment. The document identifies the key features for maximum leverage of the opportunities offered by Second Life for teaching and learning and how these can be best exploited. Among these it identifies the importance of 'play' and collaboration which relates closely to Gee (2005) and the 36 learning principles built into good video games.

Another key metaphor identified by GlobalKids was the changing student-teacher relationship in a MUVE, where teacher is facilitator and student peer mentor. In many situations learning activities may be led by the peer mentor with the facilitator standing back – the skill base in a MUVE is extensive and varied and best practice makes use of that skill base regardless of hierarchical expectations or where the expertise is located.

The GlobalKids document also highlights the more practical issues around using a MUVE for teaching and learning – including technological issues and the need to scale projects to fit resources - and emphasises that the Second Life teaching and learning should be situated within a larger Internet Ecology. This can again be seen to have close parallels with the purpose of the Sloodle mashup to create a blended online learning experience that locates Second Life within the VLE environment so it is a synchronous, active tool supported by the asynchronous VLE context, repository, forums and course material.

1.3   Mashup metaphors

Students who are "digital natives" (Prensky, 2001) have limited patience with the current formal, structured educational system. They think, play and learn in environments that are fast-paced, multimedia, multimodal, interactive and, of course, digital with expectations of engagement and high production values at all times. These volatile, interconnected, and

complex social milieus (Cohill, 2000) call for learning options that are critical, collaborative, creative, and futures-oriented.

Given these high expectations, the appeal to digital natives of an immersive learning environment such as Second Life is clear, and they quickly absorb the skills necessary to interact in this location. However, the metaphors for MUVE teaching and learning do not reference a fully rounded learning experience – rather they offer a mature option against face to face tuition, with opportunities for collaborative and community-based interaction and learning in a situated constructivist environment. A virtual learning environment can offer documented learning paths, social bookmarking and networking options, act as an information repository, enable class planning (calendar, assignment deadlines etc) and offer assessment facilities, online learning activities and SCORM compliant assessment data.

The Sloodle mashup - Second Life Object Oriented Distributed Learning Environment - offers therefore the ability to make best use of both sets of metaphor to establish a fully blended online learning experience, offering the immediacy, dynamic interaction and high production values required for activity sessions with the repository, time management and assessment opportunities offered by a VLE environment. Sloodle is an open source project driven by Daniel Livingstone from the University of Paisley, Glasgow and Jeremy Kemp, San Jose University, CA, USA with funding for development from EDUSERVE, but supported by a self-selecting community of academics and developers. It combines the uniquely immersive features of Second Life – avatars, 3-D construction, interactive scripts, immersive settings and virtual manipulatives – with the traditional VLE functions of Moodle, namely structure, threading of discussions, assignment drop-boxes, self-scoring quizzes and a schedule.

Sloodle is not yet a mature, robust technology and the system is subject to significant plans for further development. One development focus is to be able to offer SCORM compliant assessment inworld – formative and/or summative assessment – which can be dynamically sent to the VLE environment and recorded. Longer term this would enable students to maintain their e-portfolio from inworld as well.

Recently the HEA undertook a study to investigate the ways that technology was being employed to support teaching and learning in a blended (online and face to face) environment. They identified 3 key themes to this use:

- 'Traditional' (most common mode) – a VLE system used as an information repository
- 'Transformative' (innovative and relatively rare) – where technology is used to radically change course design with emphasis on interaction and communication. This correlates well with the mashup under discussion.
- 'Holistic' (emerging) – students are able to make use of a range of enabling technologies which best suit their needs at a particular time.

This would also seem to fit with the mashup proposed here, using synchronous and asynchronous technologies to provide a blended environment which therefore becomes 'holistic' and is clearly 'transformative' since existing models of interaction no longer apply.

2   Background

2.1   Introduction to Cetlment and the Sloodle environment

Second Life® is a 3D online world with a rapidly growing population drawn from more than 100 countries around the globe, in which the Residents themselves create and build a world that includes homes, vehicles, nightclubs, stores, landscapes, clothing, and games. Many companies and educational establishments are now using Second Life as a meeting space, research environment, test bed and, significantly, a teaching and learning space. Many universities are buying virtual islands in Second Life that they construct and develop in order to provide teaching and learning spaces for their students. The Open University has purchased several islands in Second Life in relation to various projects. COLMSCT, the OU CETL Centre for Open Learning, Maths, Science, Computing and Technology, has purchased Cetlment Island, which is made available for tutors to use on a range of courses and to research various teaching and learning opportunities within the multi-user virtual environment.

Building and development on Cetlment (see Figure 1: Cetlment Island) has been designed to encourage immersive behaviour from all visitors, for example many objects offer a reward of some kind (altered behaviour, animation, free gifts etc) when clicked on. The island has a Central Plaza, with strong real world metaphors of seating and planting in the core areas of Library, Resource Centre and social spaces, and various rooms and areas extending out towards the island boundaries. There are teaching and learning spaces under water and in the sky for those students and tutors who are comfortable reaching beyond real world metaphors and, situated around the island, a range of enabling technologies such as interactive whiteboards for PowerPoint presentations, podcast facilities for streaming audio and video podcasts and facilities for streaming video presentations.

Figure 1: Cetlment Island

Staff and students are free to use the island as their virtual home or to wander the reaches of the virtual world and come back only for designated, synchronous, teaching and learning events. The University accepts no liability for content that students may encounter in the reaches beyond Cetlment Island, following the precedent that it offers a website but cannot be accountable for other material that students might access through a browser.

Code of Conduct

Cetlment Island has been created to provide an online and immersive teaching and learning space and to research how to use this emerging technology in a way that can develop student support and enhance the student experience. It is intended to provide a virtual location to both support teaching and learning and to stimulate discourse and experimentation related to the potential of such spaces. The island has been designed to be recreational whilst also fulfilling its purpose, and the standard Open University Code of Conduct applies on Cetlment Island just as it does in all OU teaching and learning environments. In addition, all visitors to Cetlment Island are asked to adhere to these two specific rules of the environment:

- Cetlment Island is a "G-rated" safe area intended for people not familiar with virtual worlds to quickly become comfortable with these environments. The rules and standards for appropriate conduct, language, and behaviour for Cetlment Island are the same as one would expect to find in a model 21st century workplace.
- We encourage tutors (and students) to explore the island, and as they do so, to respect the many hours of work that went into conceptualizing, designing, and building it. As such, visitors are asked to limit all building and rezzing activity to the Sandbox, which has been created expressly for that purpose. All structures, furniture, artworks, sculptures, plants, and other elements found elsewhere on the island are not to be edited or modified in any way. You may build or create (rez) any (g-rated) thing you like in the Sandbox, but please remember that objects in the Sandbox will be returned to their owners at regular intervals.

2.2   Affordances of each technology

Second Life offers a virtual environment that suggests opportunities for situated constructivist learning, providing a synchronous environment in which learners can participate in collaborative learning activities supported and guided by a facilitator in world. In terms of Driscoll's conditions for constructivist learning;

- Learning is embedded in a fully realized, complex, interactive 3D environment which even offers environmental controls (sun, wind, rain). Unlike many other virtual worlds online there is no narrative imposed by the environment.
- Learners interact through avatars (see Figure 2: Avatars) which can use facial expressions, perform gestures, change their appearance, fly and interact with avatars using text chat, IM and (with additional software) audio.
- Learners work in groups to complete activities, exploring and negotiating as a group to complete these activities and reflecting on their practice as work in progress.
- By encouraging groups to operate a problem based approach (PBL) and investigate possible solutions to a learning question, learners are given the opportunity to test and compare multiple perspectives and, especially when several groups work on the same

problem, to become aware of multiple modes of representation (e.g. different ways of representing a system map) which further encourages ownership in learning.

- Activities are proactive and collaborative but time can be flexible to allow learners sufficient time to investigate a problem and explore in depth as appropriate within the environment, and to benefit from the interactive nature of the environment to test their developing knowledge.
- Learning activities are designed so that learners are proactive and engaged in the learning process but also encouraged to reflect on their learning pathway and the learning process underway.
- Knowledge needs to be presented in an authentic context i.e. settings and applications that would normally involve that knowledge.
- Learning activities (e.g. simulations or design/construction activities) are constructed which match real world activities/behaviours/actions and events as closely as possible.

Figure 2: Avatars

All activities are constructed as collaborative and interactive so that learners must work together, negotiate and discuss/reflect on their learning while engaged inworld. The facilitator operates to maintain that learning context and encourage further interaction and collaboration where appropriate

2.3 Identity and context

Bernstein (1990; 2000) explores a concept of identity and proposes that the reorganisation of education at state level creates significant 'official pedagogic identities' (Bernstein & Solomon, 1999, p. 27). From an understanding that identity is shaped by the manner in which orderings internal to the individual are related to and result from external orderings (within discursive and socially structured relationships), Bernstein draws upon Durkheimian concepts of the sacred and the profane to inform his definitions of pedagogic identity. In this definition the sacred references the relationship of identity to specific forms of knowledge and to the discursive and social obligations this requires, and the profane recognises the constraints and demands that economic context imposes on the sacred. The 'lynch-pin' of

this pedagogic identity is a socialization into subject loyalty, a concept first explored by Bernstein in 1971. This concept, that the subject becomes the 'lynch-pin of identity' (Bernstein, 1971, p.56) whereby any deviation from the subject may be experienced as endangering the sacred, is recognizable in avatar behavior within learning activities in Second life. Students create a strong identity with their avatar and, in their sacred face, generally conform happily to the discursive and social obligations of the environment. In this context the profane is apparent in the economic and technical restraints that may affect their ability to engage with the MUVE and threaten their participation as avatars.

2.4   Situated constructivist context

While no model of teaching and learning can be adopted wholesale without reservation, theories of constructivist learning provide a good framework for immersive educational environments such as that offered on Cetlment Island in Second Life. Driscoll (2000:3822-3) identified 6 key conditions for constructivist learning;
- Embed learning in complex, realistic and relevant environments
- Provide for social negotiation as an integral part of learning
- Support multiple perspectives and the use of multiple modes of representation
- Encourage ownership in learning
- Provide adequate time for learners' investigation and in-depth engagement
- Nurture self awareness of the knowledge construction process

2.5   Community of practice

Lave & Wenger (1991) established the theory of situated learning as having two key principles;
- Knowledge needs to be presented in an authentic context i.e. settings and applications that would normally involve that knowledge
- Learning requires social interaction and collaboration

It is immediately obvious in both theory and practice that there are strong links between these two models of learning – both emphasise the importance of embedding learning in concrete, complex and 'real' environments and stress the importance of collaborative learning.

3   Methodology

3.1   Second life – real-time engagement

On Cetlment island learners interact as avatars, using the mouse and keyboard to move and interact through text chat, recently implemented audio, animations and gestures. Previously, with asynchronous tutorials or even with text based tutorials using tools such as MSN or the Open University's proprietary Lyceum system, passive learners (or 'lurkers') were unlikely to engage and were highly passive. Within Cetlment Island the physicality of the environment encourages more active participation and engagement. We found that it was easy for learners to 'read' messages in an asynchronous forum for example, but progressively harder for them to contribute as time went on if they had not made initial contributions.

Learning activities on Cetlment island always include a physical element (even if that is simply 'now fly to the next location') so learners must engage actively as a form of social constructivism. It is the use of the virtual environment which explicitly allows the legitimate peripheral participation to happen enabling learners to move from cognitive apprenticeship to full participation.

In social constructivist terms, the learners reflect on the ways each learning space shapes their learning. Discourse analysis currently being completed has early indications that this level of reflexive practice benefits the student, giving them more sense of control over their learning and thus empowering them. For example, students who have been reticent in a tutor group forum context have demonstrated significantly higher levels of confidence in-world, both with their ability to express themselves within a group and with their willingness to share understanding and support their peers.

3.2   Sloodle bridge – VLE functionality

The Sloodle project (Figure 3: Sloodle Summary) aims to offer users the ability to transform a course from the Moodle platform VLE into a 3D interactive classroom with all the Moodle resources available to students present in the virtual world.
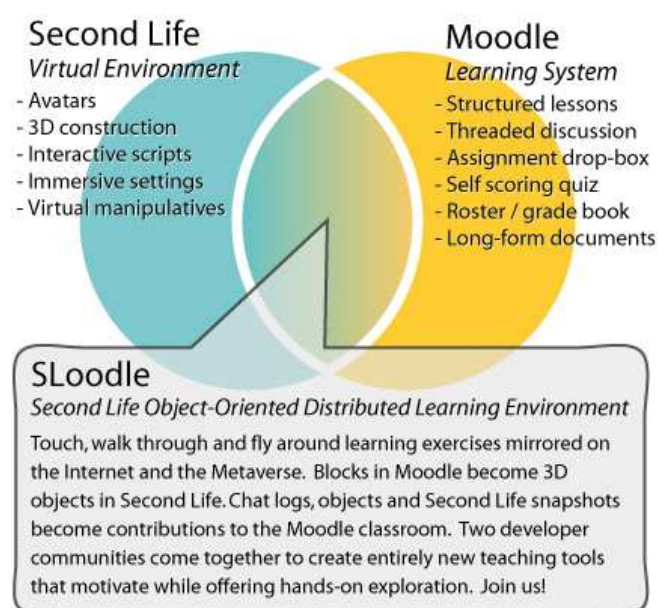

Figure 3: Sloodle Summary

As a 2D learning management system, Moodle is both open source and free to use, requiring only server space and some technical knowledge to install and administer at technical level. The software has been adopted and adapted by universities, schools, commercial training companies and individual teachers/trainers all over the world. Mashed up as Sloodle and parceled into Second Life, a 2D Moodle webpage becomes a 3D classroom where each Moodle tool – enrollment/registration discussions, blogs, assignment drop-boxes, quizzes etc – becomes a realized, interactive, metaphorical object. The Sloodle White Paper suggests examples such as 'notices in Moodle [ ] appear as flagpoles with text labels – providing clear

visual clues to important new content. Calendar information may be rendered as a wall display, while Real Simple Syndication "RSS" feeds appear in the form of radios or teletype machines.' (Kemp and Livingstone, 2007, p. 5). Development has progressed rapidly, and current beta applications include a blog toolbar, chatcast and quizchair. Most of the functionality is available through the Sloodle HUD (Heads Up Display), which is worn by an avatar inworld and provides easy access to functionality such as the blogging. Other tools are 'rezzed' (created) inworld as required as 3D objects and accessible to all avatars or screened as required.

This means that the Sloodle environment becomes a classroom metaphor (teaching and learning tools available to the class and to the students) but without the necessity to maintain current real-world classroom metaphors or be restrained by the 2D, linear style interaction of the VLE environment.

This also means that teaching and learning spaces on Cetlment Island can take a variety of forms and while the more formal spaces have been explored in previous papers, this enables use of less conventional spaces for teaching and learning and also enables more proactivity for learners. They can be proactively engaged in the learning process and in other activities simultaneously in a way which is not possible in real world tutorials and this seems to support the learning process as well.

As part of this, the Sloodle HUD (see Figure 4: Playing an Elven Drum Whilst Facilitating, Wearing a HUD) can be 'worn' by avatars during teaching and learning sessions and this not only provides a quick and easy link to their blog so they can record thoughts, results, activities and reflexive commentary during a session but also offers additional functionality such as particular gestures to use during tutorials – although it is hoped that they would not make too much use of the "nodding off" animation except to make a point!

Additional functionality can then be added to this toolbar and, together with the group tools such as the realtime relay of the Second Life chat to the VLE forums, the mash-up gains momentum.

Figure 4: Playing an Elven Drum Whilst Facilitating, Wearing a HUD

3.3 Prensky's 7 games – individual and collaborative

In 'The Seven Games of Highly Effective People' (Prensky 2004), Prensky uses concepts from Covey's book 'The Seven Habits of Highly Effective People' (Covey 2004) to propose that well-designed computer games can have a positive impact on learning, working and living. Covey writes that people who are considered to be successful in their lives demonstrate seven recognizable habits – 3 individual, 3 collaborative or group and 1 'meta-habit' - and Prensky proposes that these habits are 'clearly developed in computer game players'. The habits summarise as:

- Be proactive: the habit of doing rather than waiting (individual)
- Begin with the end in mind: the habit of having a clear goal from the start (individual)
- Put things first: the habit of not neglecting the 'important' for the 'urgent' (individual)
- Think win-win rather than compete (group)
- Seek first to understand, then to be understood (group)
- Synergise: seek strategies that make the union greater than the sum of its parts (group)
- Continuous improvement: strive to build on what you have (meta-habit)

Prensky writes from a significant bias, published in this instance by Microsoft, but the fundamental elements of his model are applicable beyond the games community and into the wider world of online learning – successful online learners function well both as individuals and as members of a group.

A similar heuristic is suggested by Lepper and Malone (1987), who identified key elements from gaming that are valuable for engaging learners and ensuring proactive and constructive learning activity.

- Challenge: A player must have the ability to vary the difficulty of the game, and there should be multiple goals for winning the game. There should also be sufficient randomness in the action and constant feedback about performance.
- Curiosity: The activity should offer sensory stimulation and enough novelty (or "disequilibrium," to use Piaget's phrase) to want to stay with the game.
- Control: The player should feel in control over the activity, able to make choices and to witness the effects of such choices. When the choices are genuinely unclear, the learner should be able to have the ability to gather information in order to make an informed choice.
- Fantasy: The player should feel involved with the gaming environment and the characters in the game.
- Interpersonal Motivation: A game becomes more motivating when a player can meet and work together with other players, can engage in friendly competition and can earn respect among peers for performance.

3.4 Current situation

The model is developed after initial trials on 2 Open University courses, T175 and M364.

T175 is a 30-credit Level 1 Technology course entitled 'Networked living: Exploring

Information and Communications Technologies' that examines the networked world we live in and the ICT systems which underpin this.

Cetlment Island was used for two tutor groups on T175. In the conventional form of the course there are 4 face-to-face tutorials during the 9 months of the course which are each 2 hours long. These were substituted with tutorials on Cetlment Island for both groups. Attendance for these virtual tutorials was higher than is normally the case for T175 face-to-face tutorials, which is of importance to the University as falling tutorial attendance is a priority issue at the moment. This also means that tutor groups can be more geographically diverse since students do not need to travel to attend tutorials.

In the next stage, comprising the formal study and evaluation, the tutorial pattern will change to take advantage of the affordances offered by the virtual tutorials rather than substitute for the face to face model. Tutorials will be for one hour rather than 2 hours to capitalize on the immediacy, presence and dynamic nature of the environment and take place monthly enabling students to plan better for attendance and allowing progression and development between tutorials.

M364 is a Level 3 Maths and Computing course entitled 'Fundamentals of Interface Design' which explores the iterative design model and evaluation metrics involved in software development and the principles and practice of interface design. Again the normal pattern for the course is to hold 4 face to face tutorials during the course for two hours each. However for this group, geography made this impossible since students were spread across a very broad area of the United Kingdom. Therefore the course made use of Lyceum, a proprietary Open University audio conferencing system, which is relatively unpopular because it is not intuitive and dynamic and does not encourage a sense of presence and community. The decision was therefore made to use Cetlment Island for the tutorials in order to develop this sense of community and engagement.

For both courses, it rapidly became apparent from early tutorial experiences that it was vital that students were proactive and working together during tutorials to construct and engage. It also became apparent that there were two ways in which Second Life could be used – as a meeting space offering affordances through the physical presence of avatars or as a constructive space. Initial tutorials tended to use the space primarily as a meeting space which does not engage students – just as 'chalk and talk' does not engage in the classroom. Therefore the PIC2 model was constructed to be the model for testing in the formal evaluation stage.

The formal evaluation stage will include a second cohort of students for these two courses identified above but also two more Open University courses, both of which make significant demands on students in terms of the group working and engagement that has historically been unpopular and challenging for students in an asynchronous, distance context. The PIC2 model is being used as the basis from which to construct a series of learning objects which can be tested on the different courses to provide a wider range of data for examination.

3.5 PIC2 Model

Working from this research and experience, the model we have constructed and previously presented to support learning design on Cetlment Island is the PIC2 Model (see Figure 5: PIC2 Model), comprising 4 basic elements:

- Proactive activity (avatars must be 'doing' something at all times)
- Interactivity (avatars must be interacting with the environment, tools, objects and others while working)
- Collaborative (avatars must be working in groups which become communities of practice, supported by the facilitator)
- Constructivist (avatars must engage with experiment, test and explore activities without predefined learning paths, methodologies and solutions)
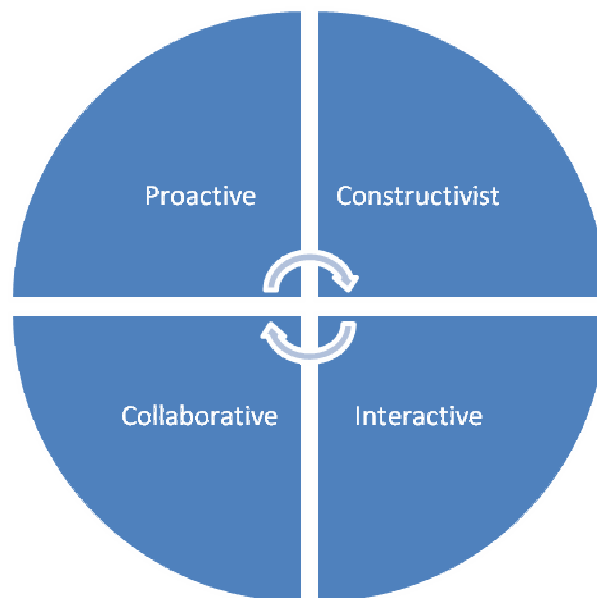

Figure 5: PIC2 Model

The situated constructivist learning that takes place on Cetlment Island is also intended to build expressly on the work of Vygotsky. The MUVE offers explicit opportunities for learners to interact with peers and proceed collaboratively, in a community of practice, to the next developmental zone, remaining at all times within the zone of proximal development i.e. being challenged to progress to the next natural level but not beyond. This requires careful scaffolding of activities by the facilitator to support the learners, plus careful planning of learning events to ensure that they enable learners to learn through a proactive, interactive, collaborative and constructivist process. We believe that this model of learning event and learning activity best supports learners and we have established through experience that designing learning activities that interrogate the model in terms of 'what', 'who', 'how', 'when', 'where' and 'why' (with reference to identified learning objectives) allows us to build activities that are successful and appropriate in the environment. Without the use of Second Life we would need to interrogate the model very differently and would have very different metaphors to employ. It is likely that these models would not be as 'naturalistic' to learners and therefore may move them immediately out of the zone of proximal development and away from situated constructivist learning to more abstract models and theoretical

perspectives, which would also disenfranchise them from operating in a community of practice, generating instead a community of concept.
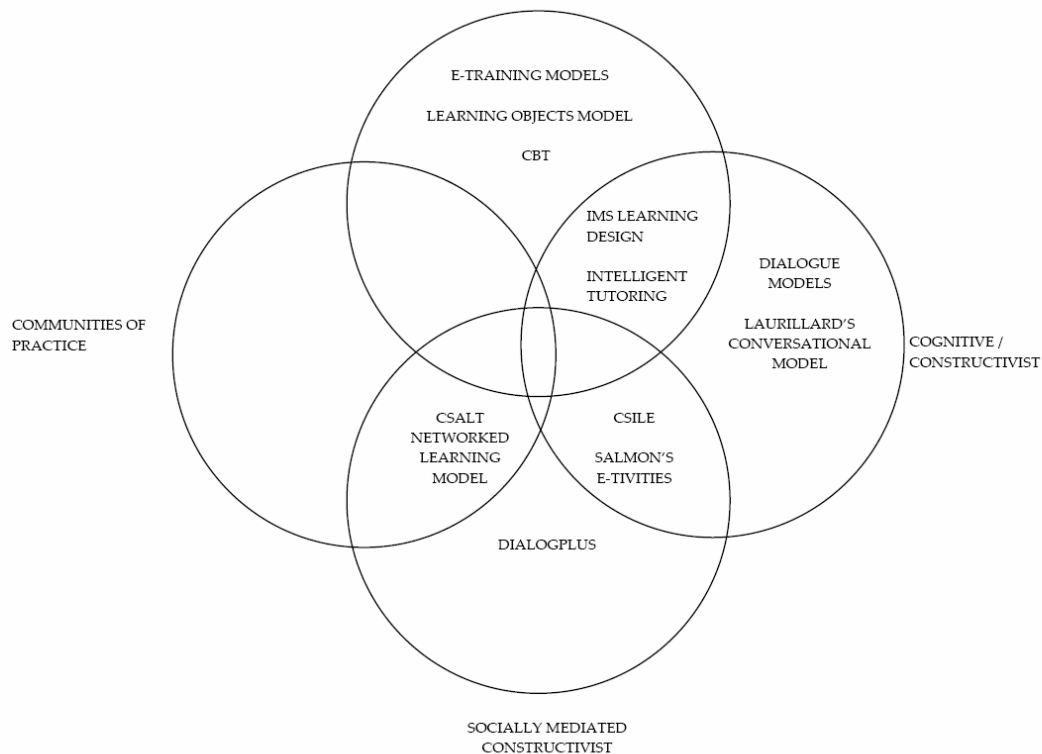

Figure 1 - JISC e_Learning Models Desk Study p25

The PIC2 model has some derivation from the JISC analysis of e-Learning models and affordances (2006), which mapped the range of e-learning models to demonstrate a location in reference to the theoretical positions which underpin them. The PIC2 model is constructed to sit at the fulcrum of this mapping, offering an immersive overlap of all 3 theoretical positions based on the forms and opportunities of the learning objects model to facilitate teaching and learning.

3.6   Potential of this mash-up – extended learning objects approach

The Mason, Pegler & Weller (2003) approach to learning objects centered course design assumes that each object is a unit of study that represents a holistic unit of study. The concept of 'extended' learning objects allows for narrative flow through the objects so they are not isolationist. Here, an object comprises;

- a discursive element
- an interactive element
- an experiential element
- a reflective element

to make up a single, fully rounded unit of study that maximizes the potential of VLE and MUVE functionality to provide a more immersive and reflexive learning experience. Thus a learning object can be considered a constructivist tutorial activity with built in asynchronous activities for example, introduced by the facilitator and with a reflexive, blogged discussion afterwards. The "glue" connecting these objects is described as narrative learning objects, which are non-reusable since they are specific to the single learning instance and use the particular learning objectives, aims and themes which do not translate to a different context. However the extended learning object itself is both standalone and transportable – the structure, approach, flow, constructivist activity and progression model can be used in more than one context. This is, as we have seen, important for immersive blended learning to provide a balance for course designers in terms of time and effort involved to produce these syntheses.

This approach is predicated on certain assumptions:

- Just-in-time learning is more effective than just-in-case learning – students learn more easily if they can see 'why' they are learning as well as 'what' they are learning. This is closer to the industry model of CBT rather than traditional academic models.
- Courses overloaded in terms of time and content lead to students dropping out. They also lead to surface rather than deep learning, as students do not have time to engage with the material and rapidly learn to concentrate only on material directly referenced by assessment materials for example.
- The university cannot produce engaged, blended, multimedia and interactive resource material of sufficient quality, quantity and currency supported by proactive tutor interaction to meet rising student expectations unless they can reuse materials created by others or find more practical ways to re-purpose their own materials.

3.7   Evaluation metrics to be used

Evaluation metrics to be used will include interviews with students and tutors after at least one tutorial from each course, naturalistic observation of students during tutorials organised by the IET User Lab and discourse analysis undertaken on transcripts from the tutorials. The tutorials to be evaluated in this way will be taken from each course making use of the same pair of learning objects, repurposed for each context so that parallels can be drawn and the learning objects approach tested in relation to this model. This will also be triangulated against material available in the VLE repository including forum transcripts, online activities and chatlogs. Students and tutors participating in the evaluation will also be encouraged to make use of the VLE blogging facility to record their journey and reflect on their practice during the course and this data will also be evaluated, subject to usual University Ethics Committee requirements.

3.8   Outcomes from evaluation

Anticipated outcomes from this evaluation are expected to show the importance of community of practice, proactive involvement and constructivist learning in this environment and to be able to begin mapping how these can be successfully employed in this environment

to leverage effective teaching and learning. Assuming the successful introduction of MUVE tutorials and the effective use of the Sloodle bridge to fuse the MUVE tutorials and the asynchronous online learning materials in the VLE, it is anticipated that rollout of this facility will continue to a range of other courses and to other Faculties.

3.9 Success criteria

Of particular concern to the University at present is falling attendance at face-to-face tutorials and this is felt to be a significant factor in course drop-out rates and student reports of isolation. This is a particular challenge for the Open University since there is no physical campus for students to meet. Therefore one key success criteria for this evaluation will be the use of Cetlment Island by students beyond formal tutorial time as a social space to build a student community.

Given the falling attendance at face-to-face tutorials, another success criteria will be attendance levels at these shorter, more frequent tutorials and this can also be measured against course drop out levels to see if there is a connection.

Other success criteria will be more ephemeral but can be based on data such as increased use of Web 2.0 tools in the VLE environment such as blogs and tag clouds to build and share resources and also on interview data, observation and discourse analysis.

4 Outcomes

4.1 Mapping pedagogy and learning outcomes

Evaluation does not always ensure a clear and constructive link between methods and pedagogy, yet if the evaluation is to be useful it is necessary that it informs future practice and enables the development of a taxonomy of learning objects which can be used in the mash-up MUVE to facilitate greater learner involvement and engagement.

A logical way to start this process will therefore be to match the results of the evaluation in terms of outcome and success criteria against the learning outcomes for the courses involved in the project. From this it should be possible to assess the impact of each of the key pedagogies which underpin the PIC2 model in relation to the specified Learning Outcomes for each course.

Since the pedagogies are linked explicitly with the Learning Objects used across all courses involved in the project, it should then be possible to evaluate the impact of each Learning Object against these Learning Outcomes using a Likert scale approach. This should enable the mapping of a taxonomy of these Learning Objects in terms of their reuse, repurposing and rebadging in the mash-up as tools for academics when constructing course materials and activities. The anticipated outcome from this therefore is that this taxonomy of Learning Objects will be available to academics involved on more Open University courses as they come on board and therefore this will become a developing, reflexive resource available to all courses and quickly establishing high-level use of the SecondLife/VLE mashup to provide an online blended learning environment where students are proactive, collaborative and part of a community of practice.

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4.2   Key affordances and implementation strategy

Gibson (1977) defined affordances as all "action possibilities" latent in the environment, objectively measurable and independent of the subject's ability to recognize them although always relative to the subject and hence dependent on their abilities. The Sloodle mash-up offers a significant number of affordances that can be measured in the context of the taxonomy under development, providing rich data with which to develop learning objects that can be repurposed across a range of OU courses. For example key affordances to be examined in the next stage of the project include development, facilitation and support for student instigated learning events and possible inclusion of formative assessment opportunities and SCORM compliant assessment data.

4.3   Conclusions

The emergence of the Sloodle mashup over the past academic year has afforded great potential in the development of MUVEs for teaching and learning. Experience gained with student tutorials has led to the establishing of a strong academic model for learning design within the Second life environment, built on foundations of existing theories, models and concepts of learning and pedagogic identity and context.

References:

[1] Aldrich, C.: Learning by doing: a comprehensive guide to simulations, computer games, and pedagogy in e-Learning and other educational experiences. 2005

[2] Bernstein, B.: On the classification and framing of knowledge in: M. F. D. Young (Ed.) Knowledge and control (London, Macmillan), 1971

[3] Bernstein, B.: Pedagogy, symbolic control and identity: theory, research and critique (revised edn) (London, Lanham, Rowman and Littlefield), 2000

[4] Bernstein, B.: The structure of pedagogic discourse (London, Routledge), 1990

[5] Bernstein, B.; Solomon, J.: Pedagogy, identity and the construction of a theory of

[6] Bransford, J. D.; Brown, A. L.; Cocking, R. R. : How People Learn: Brain, Mind, Experience, and School. Washington, DC: National Academy Press, 2000.

[7] Brown, J.S.; Collins, A.; Duguid, S.: Situated cognition and the culture of learning. Educational Researcher, 18 (1), 32-42, 1989.

[8] Bruner, J. : Actual Minds, Possible Worlds. Cambridge, MA: Harvard University Press, 1986.

[9] Castells, M. : The Rise of the Networked Society. Oxford, UK: Blackwell Publishers.1996

[10] Cohill, A. M. : Networks and the knowledge democracy: Nine challenges for communities. (2000). Last accessed 10th August, 2007 - http://designnine.org/library/docs/kd_concepts.pdf

[11] Cole, M.; Engestrom, Y.: A cultural-historical approach to distributed cognition. In G. Salomon (Ed.),, Distributed Cognitions.

[12] Covey, S.: The Seven habits of Highly Effective People (UK, Simon and Schuster Ltd), 2004

[13] Dede, C.; Clarke, J.; Ketelhut, D. J.; Nelson, B.; Bowman, C.V: Fostering motivation, learning, and transfer in multi-user virtual environments.(2005) Paper presented at the American Educational Research Association Conference, Montreal, Canada.

[14] Dewey, J.: Experience and Education New York: Macmillan, 1938.

[15] Dickey, M.D. : Brave new (interactive) worlds: A review of the design affordances and constraints of 3D virtual worlds as interactive learning environments. Interactive Learning Environments. 13(1-2) 121-137, 2005

[16] Dickey, M.D.: Three-dimensional virtual worlds and distance learning: two case studies of Active Worlds as a medium for distance education, British Journal of Educational Technology 36(3): 439-451, (2005).

[17] diSessa, A. A. : Changing Minds: Computers, Learning, and Literacy. Cambridge, MA: MIT Press, 2000.

[18] Duffy, T. M.; Jonassen, D. H. : Constructivism and the Technology of Instruction: A Conversation.Hillsdale, NJ: Erlbaum, 1992.

[19] Gee, J.P. : What video games have to teach us about learning and literacy. 2005

[20] Gibson, J.J.: The Theory of Affordances. In R. E. Shaw & J. Bransford (eds.), Perceiving, Acting, and Knowing. 1977

[21] Global Kids, Inc.'s Best Practices in using Virtual worlds for Education, available from http://holymeatballs.org/2006/10/sl_best_practices_for_educatio.html [last accessed 7 Sept 2007]

[22] Herz, J.C.: Gaming the system: what higher education can learn from multiplayer online worlds; 2001, http://www.educause.edu/ir/library/pdf/ffpiu019.pdf [last accessed August 21st 2007]

[23] Johnson-Laird, P. N.: Mental Models. Cambridge, MA: Harvard University Press, 1983.

[24] Kemp, J: Livingstone, D: Putting a Second Life "Metaverse" skin on Learning Management Systems; 2007, http://www.sloodle.com/whitepaper.pdf [last accessed September 8th 2007]

[25] Koschmann (Ed.): CSCL: Theory and Practice of an Emerging Paradigm, Mahwah, NJ; Lawrence Erlbaum, 1996.

[26] Lave,; Wenger, E.: Situated learning: Legitimate peripheral participation. Cambridge, U.K.; University of Cambridge Press.(1991)

[27] Leont'ev, A. N.: Problems of the Development of Mind. Moscow: Progress Publishers, 1981.

[28] Mason, R; Peglar, C; Weller, M: Putting the pieces together: What working with learning objects means for the educator, Elern International, Edinburgh, 2003

[29] Mayer, R. E.: Thinking, Problem Solving, Cognition. New York: W. H. Freeman, 1983.

[30] Mayes, T.; de Freitas, S.: JISC e-Learning Models Desk Study Stage 2, available from http://www.jisc.ac.uk/uploaded_documents/Stage%202%20Learning%20Models%20(Version%20 1).pdf, [last accessed 7 Sept 2007]

[31] Pallof, R. M.; Pratt, K.: Building learning communities in cyberspace. San Francisco: Jossey-Bass Publishers. 1999

[32] Prensky, M.: "Don't Bother Me Mom-I'm Learning!", Paragon House, St. Paul, MN, 2006

[33] Prensky, M.: Digital Natives, Digital Immigrants. On the Horizon. NCB University Press 9(5). http://www.marcprensky.com/writing/default.asp.

[34] Prensky, M: The Seven Games of Highly Effective People, available from http://www.marcprensky.com/writing/Prensky-The_Seven_Games-FINAL.pdf [last accessed 8 Sept 2007]

[35] Quinn, C.: Engaging Learning: designing e-Learning Simulation Games. 2005

[36] Resnick, M.: Turtles, Termites, and Traffic Jams: Explorations in Massively Parallel Microworlds. Cambridge, MA: MIT Press, 1994.

[37] Robbins, S.: "image slippage": navigating the dichotomies of an academic identity in a non-academic virtual world" in Proceedings of the First Second Life Education Workshop, Part of the 2006 Second Life Community Convention, August 18th-20th 2006, Fort Mason Center, San Francisco, Ca.

[38] Salmon, G:, E-Moderating, the key to online teaching and learning, Routledge, (2004).

[39] Sociology of Education, 20, 265–279, 1999

[40] symbolic control: Basil Bernstein questioned by Joseph Solomon, British Journal of the

[41] The Second Life Best Practices in Education: Teaching, Learning and Research 2007 International Conference http://slbespractices2007.wikispaces.com

[42] UK literature and practice, The Higher Education Academy, (October 2006).

[43] Vygotsky, L. S. : Thought and Language. Cambridge, MA: MIT Press, 1962.

[44] Vygotsky, L.S. : Mind in Society. Cambridge, MA: Harvard University Press, 1978.

[45] Wenger, E. : Communities of practice: Learning, meaning, and identity. Cambridge, U.K.; University of Cambridge Press. 1999

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