

The skeleton in the seminar: Teaching and learning in virtual worlds

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Abstract. How do virtual worlds and MMORPGs function as learning spaces? What kinds of mentoring, pedagogy, collaborative learning are emerging from early experiments with these spaces? And what is the relation between these processes and their real world counterparts? This paper presents examples of teaching and learning in *Second Life* and *World of Warcraft* from recent research projects. It explores performative and discursive aspects of teaching and learning in avatar-based environments. It argues that these are ambiguous spaces in new ways which can be confusing for learners, but which can be ultimately productive if the available resources are managed in the interests of the learner.

Keywords: virtual worlds, teaching and learning, drama, new media

Virtual worlds, dramatic spaces, game worlds

What are virtual worlds? This question has been hotly-debated, not just in our net-inflected world and the virtual worlds of the 3-D web, but since ancient times. *Second Life* anthropologist Tom Boellstorff (2008) cites Plato's cave, earthly life represented as shadows thrown on the wall by the firelight, as a kind of virtual world – though he points out too that the perceived relation of 'real' to 'virtual' has been inverted in our times: for Plato, our 'real' world is the shadow.

A more contemporary philosophical imagining of virtual worlds, again cited by Boellstorff, is Foucault's heterotopia (Foucault, 1984). Unlike utopias, which Foucault defines as unreal ideal places, heterotopias are liminal, transgressive real spaces in every culture, places of ritual and taboo. Foucault's examples are places such as cemeteries, brothels, colonies, ships. In many ways, these are appealing analogies for the spaces to be found in virtual worlds and online games, which do seem to have a predilection for such liminal territory. However, what makes Foucault's image more appropriate to the virtual nature of such worlds (itself a contested term, of course), is his image of the Mirror, an interstitial space between utopia and heterotopia, a standpoint which both clarifies and confuses his presence in either:

From the standpoint of the mirror I discover my absence from the place where I am since I see myself over there. Starting from this gaze that is, as it were, directed toward me, from the ground of this virtual space that is on the other side of the glass, I come back toward myself; I begin again to direct my eyes toward myself and to reconstitute myself there where I am. (Foucault, 1984, pp. 47).

This image is appealingly similar to the figure of the inhabitant of a virtual world, their 'real' corporal self crouched over the computer screen, their 'reflection' active in a world which might be unreal (utopic) or real (heterotopic). In the end, Foucault's meditation serves to flesh out the ontological ambiguities of presence and absence, virtuality and reality, in this context.

Our challenge is to accept that such ambiguities are not resolvable; or to make a possibly rash decision. My decision, for what it's worth, goes like this. There is a difference in the ontological status of myself and my avatar. My efforts to construct my own identity rely heavily on contexts and forms of representation: speech, costume, gesture, facial expression, belongings, residences, accoutrements. In the virtual world, these are not simply representations, however (of cultural affiliation, wealth, taste, and so on) – they are representations of representations – they are doubly-articulated signs. By contrast, such representations in real life are singly articulated. A shirt may represent a Goth sensibility, but it is a shirt, not a representation of one. Secondly, and perhaps more importantly, these representations in real life (RL) are what I'll call dependent – dependent on and anchored in embodied identity (not in a representation of embodied identity). From a phenomenological point of view, this selfhood articulates the psycho-social apparatus of identity with the sense-perception apparatus. At the same time, the communicative apparatus of the body can be fully deployed in the social expression and construction of identity. In the avatar, only sight and sound are engaged directly of the array of sense-perception; the rest are represented. In terms of expressive potential, only speech can be directly employed; elsewhere, limited representations of communicative processes are employed. To summarise: there is a qualitative difference between identity inhering in the embodied presence of the Real World and the less durable, ontologically removed, modally more restricted, projected identity of the virtual world. This is not to say, however, that the forms of self-exploration, extension and expression made possible by avatar-embodied projections are not valuable; and in the context of this article, valuable in the context of teaching and learning.

In considering the nature of the social performances of virtual worlds, I have a particular analogy in mind. For me as a former teacher of English, Drama and Media in secondary schools, virtual worlds have an educational ancestor. This is drama and simulation. For example, when I was an English teacher I conducted an improvised drama based on the Old English epic tale *Beowulf*, in which my Year 8 class were the warriors in Hrothgar's mead-hall, awaiting the arrival of the monster Grendel. Another example was an extended improvisation based around Longfellow's *Hiawatha*, in which the four classes of Year 8 became tribes of the Iroquois nation, enacting elements of the story of Hiawatha, and inter-acting through simulations of trade and combat between lessons.

These activities were typical of the kinds of educational drama, or process drama, pioneered by figures like Dorothy Heathcote and Gavin Bolton. They also incorporate elements of the drama 'conventions' adapted for educational drama by Jonothan Neelands from the work of Brazilian theatre practitioner Augusto Boal. Perhaps the most emblematic convention developed by Boal was 'forum theatre', radical in terms of textual authority because it handed the power to create the drama to the actor/spectators; and equally radical in its political implications for the often dispossessed people with whom he worked (Boal, 1992).

But what has all this to do with virtual worlds? There are three important similarities, I want to suggest. Firstly, the working-out of a drama in process is core to both. The building and maintenance of an imaginary world, and the rituals, encounters, adventures, and humdrum activities we engage in within it, are common to both. The semiotic tools are different, but perhaps only superficially. Whether a configuration of computer graphics represents a tool, or the rulers and paper tokens that represented Iroquois coup-sticks and wampum bead currency in our Hiawatha drama, the principle is the same. An act of symbolic substitution is going on of the kind the Russian developmental psychologist Lev Vygotsky had in mind when he offered a child using a broomstick as a horse by way of illustrating the imaginative work of play (Vygotsky, 1962). Physical objects, then, have a different ontological status from their

status in non-dramatic life, and closer to their status in virtual worlds. They are representations of something other, something belonging to what Heathcote called the 'as-if' of drama (e.g., In Heathcote & Bolton, 1996). They belong inside Huizinga's famous 'magic circle', where the rules of play and not the real world apply; and the consequences of actions in the real world do not apply (Huizinga, 1949, pp. 10). However, there is much debate about the magic circle's impermeability. Edward Castronova argues, for example, that its impermeability is compromised by the political economies of virtual worlds like Second Life, where money and certain aspects of legal and regulatory activity cross the boundary between the virtual and 'real' worlds (Castronova, 2005). But other kinds of leakiness can be argued. There are times in the 'real world' where an 'as-if' ontology seems to apply – when we dress up for an interview, playing the role of the professional worker we hope to be if appointed; where we pretend to be cross with a child to emphasise the seriousness of a situation; where the child pretends to be upset to win sympathy. By the same token, there are many situations in games and play where the 'as-if' ontology gives way to real world pressures and consequences: where we might have 'really' offended someone in the virtual world; where our representation of ourself as avatar causes reactions similar to those our physical selves cause in the real world (baldness in my case); where our communicative practices are closely related to those we possess in real life – a fluency in certain kinds of language, perhaps; or a sense of humour; or alternatively a facility counterposed to a disability in real life – walking and running for wheel-chair users; or 'hearing' text-based dialogue for deaf people (c.f. Carr, 2010).

Secondly, and more specifically, both involve role-play. In fact, as Goffman reminded us, it's a core process in life itself, in the construction and performance of selfhood (Goffman, 1959). The process of improvisatory performance, whether of social selves or imagined selves (perhaps all our identities are a combination of these types) is at the root of this kind of drama. Again, it's possible to distinguish between dramatised bodies within the magic circle of a drama and its 'as-if' imaginary world, and dramatised bodies outside a dramatic context; and how both relate to the body of the avatar. The body outside a dramatic context represents itself – it might dramatise the role of doctor or waiter, as Goffman describes – but it really is doctor or waiter; just as its surgical gown or waiter's apron are really those things, rather than representations of something else. Inside the drama – and in the virtual world – everything is a representation of something else. In RL drama, it's a child's body pretending to be the body of an Iroquois warrior; his shirt pretending to be the buckskin, his voice, gestures, face, all pretending to be those of the warrior. In the virtual world, it's a programming or scripting language, wire-frames and pixels pretending to be those things.

Thirdly, both drama and virtual world possess the possibility of crossing the boundary of the magic circle. This is the essence of Boal's forum theatre – an ability to step in and out of the drama to plan, observe, critique. Process drama routinely does this as part of its improvisatory work, its composition-in-performance. In virtual worlds, we oscillate between an immersion in the world and the avatar and a sense of ourselves sitting in the chair in front of the computer. We have a range of functions to allow for avatars to be out of character in a Massively Multiplayer Online Role Playing Game (MMORPG), or away temporarily in *Second Life*. A commonsense understanding of role is that actors are as deeply immersed as possible: but in fact drama educators make the point that engagement in role is gradated, and that degrees of role distance are possible and desirable (Carroll & Cameron, 2005).

There are, for the purposes of my argument here, two implications of these debates about the nature of virtual worlds. The first is that no simple assumptions can be made about our virtual selves and our virtual worlds, no easy reading-off of analogies between the two. We oscillate between them, in something like Foucault's mirror, and if we are to consider their

educational potential, we must take account of this space of imperfect reflections, inversions, tenuous relationships. The second implication is that virtual worlds are dramatised spaces; firstly in the same way that our performance of selfhood (and identities as teachers and learners) is always dramatised in RL; but also because of the possibility afforded to experiment with different representations of ourselves, for students to direct the trajectory of the drama, for teachers to be dramaturge as well as pedagogue.

First steps in a virtual world: leaky boundaries

My first experience of a virtual world was in a research project looking at role-playing games (AHRB 'Textuality in Videogames', 2001-3 – see Carr et al., 2006, for a full account of this research). As part of this project, my colleague Diane Carr and I spent a good deal of time in the MMORPG *Anarchy Online*, a sci-fi-styled world offering a range of roles, locations, and other resources.

This has served us since as an example of learning – in this, case, learning how to exist in a virtual world. My lessons particularly involved, for example, learning how to work with a team of people, how to fight and shop, and how to manage social encounters of various kinds, when these social encounters were mediated by avatars. Online collaborative endeavour has sometimes been seen from the point of view of communities of practice (Wenger, 1998). The structures of communities of practice do seem to apply to groups in virtual words; though the rhetoric of busy, pro-social communities does not necessarily fit. Figure 1 shows my avatar, Nirvano, discussing with a newly formed group how to go about a mission together. It seemed a negative lesson to learn: the partners were suspicious of each other, there was no clear sense of the levels of commitment which communities of practice expect, and I was not the only 'legitimate peripheral participant'. I mention this here as a counterbalance to the celebratory rhetoric that sometimes accompanies accounts of either communities of practice or online structures (or both). While Henry Jenkins has illuminated this field in many ways, his vision of collective intelligence by no means describes all that takes place (Jenkins, 2002).



Figure 1. My avatar in Anarchy Online, *Nirvano*, attempting to join a team

Another apparently negative lesson was learned in an encounter with an avatar who made an offensive remark about my avatar's physique, which I had chosen to be a little stocky, in acknowledgment of my actual physical build. His opening remark was "When's the baby due?", at which I took offence (Figure 2). There were two lessons to be learnt here. The first was the oddness of this apparent suspension of normal social rules of etiquette; and the equal oddness of my offence at rudeness directed at a graphic representation. These oddities relate to the ontological status of the avatar, and the extent to which such events are seen as protected by the rules of drama, game or play. If the 'psychosocial moratorium' often claimed for game and play-spaces, or the role protection claimed for process drama, really applied for me, I would not have taken offence. So this is either the misconstrual of a virtual world encounter by a newbie, or these rules and circles are more leaky than is sometimes supposed. Looking back ten years later, I think it's a little of both. The implication is, of course, that some kind of mentoring is required in virtual worlds (we cannot simply assume that everyone intuitively understands what's happening); and that the boundary between RL embodied identity and Virtual World projected identity is insecure: we should routinely expect leaks, and unexpected consequences; and we should take specific steps to specify the rules of a situation to our (specified) community if we want to minimise this.



Figure 2. My avatar, *Nirvano*, and Diane Carr's avatar *Grayse*, meet a challenging stranger in *Anarchy Online*

Teaching and learning in *Second Life*

A second project some years later looked at teaching and learning in *Second Life* (Learning from Online Worlds: Teaching in *Second Life*, funded by the Eduserv Foundation). Part of the project involved conducting a series of seminars with MA students on two programmes at the London Knowledge Lab: MA Media, Culture and Communication, and MA ICT in Education. In the first programme, students following a module in computer games opted into three seminars: a getting-to-know-you seminar; a seminar with a visiting animator; and a seminar with a visiting lecturer from the University of Cape Town. Six students participated. In the case of the second programme, all students following the relevant module attended a series of seminars in *Second Life*.

What did we find?

Firstly, that embodiment as an avatar could change students' learning behaviour, or classroom identity. The most dramatic example of this was a student who was normally quiet, studious and deferential to authority. He appeared at the first seminar held in *Second Life* (an introductory session for students to get used to SL) in a surprising guise. We thought he had not appeared until we noticed knives flying past us, and looked up to see him sitting on top of a large lampshade (Figure 3). He was wearing a Mexican 'Day of the Dead' skull, and had adopted the name Cheapo Umaga. In a second seminar, which was set up by Marion Walton, an academic at the University of Cape Town, he appeared again in this guise, and we noted a propensity for asking challenging questions, in this case about the actions of a guild in *World of Warcraft*, the topic of the seminar.

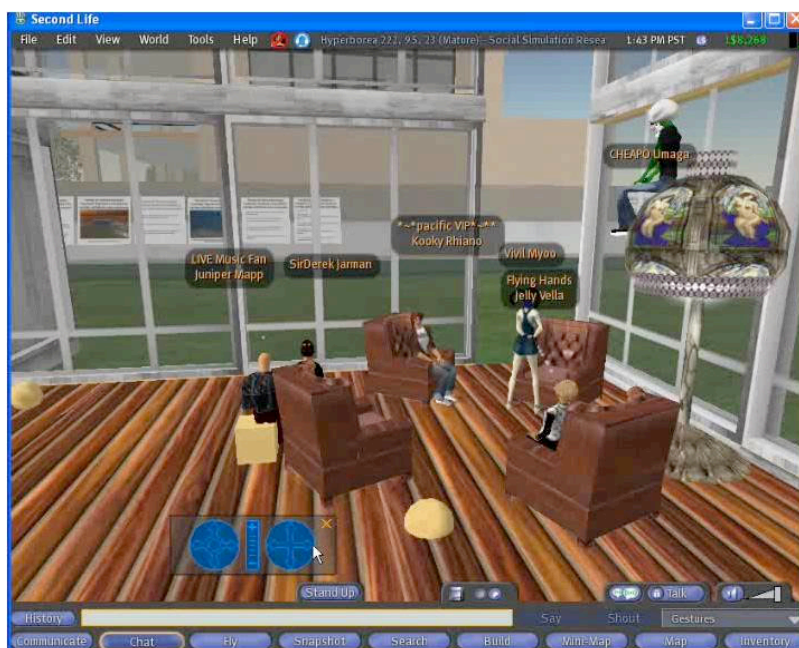


Figure 3. Our first MA visit to Second Life

What enabled him, then, to move from his customary quiet, deferential mode of learning to this challenging class clown? One possible explanation was that he was an experienced player of *Counterstrike*. It transpired that Cheapo was his nickname from *Counterstrike* days, gained when he fired on his own allies (a cheap shot). The elements of *Second Life* which evoke the environment of a game, then, seemed to have given him permission, as it were, to enact a playful, even aggressive, in-world identity, even though he knew the situation was an educational one. The confusion of semiotic domains – in effect, the confusion of the seminar room and the game-world – gave him licence to behave quite differently.

Another possible explanation was that playing the role of Cheapo had the kind of ontological transience that I have suggested above. Although the situation was not make-believe, there was enough 'as-if' about it to permit a kind of irresponsibility in the performance of this role, the freedom from real-life consequences that drama theorists call 'role protection', and game theorists call the 'psychosocial moratorium'. Playing his real life student role under his actual name implied consequences, long-term commitment, ontological substance and durability. In this case, the escape from these provided more room to learn, to question, to challenge, to refuse conventional hierarchies.

A second finding of this project was that, as might be expected, students had mixed feelings about the quality of the *Second Life* experience. One obvious but important point to make here is that their perception of the virtual world depended at least partly on what they were comparing it with. In this case, there were two points of comparison. On the one hand, it was being measured against face-to-face seminars, the typical experience of fulltime students on this MA programme. On the other hand, it was being compared with the VLE through which part-time students accessed the course (in this case, Blackboard). The following extracts from interview transcripts represent the polarised views of two students from the MA Media Culture and Communication, the first full-time, the second part-time:

REAL LIFE GIRL ...

The interface is easier I think, in the VLE. I'm not a big fan of them either. It's fine for uploading and to write something and get feedback, that's alright, but if somebody needs to work, for me it's hard. I even have problems doing that over Skype – I find it really hard and sometimes people don't understand either and they need a bit more time to see what people mean. I find it very complicated.

... AND VIRTUAL WORLD BOY ...

though i am still quite amazed - even now - that we are 3,000 miles away and sitting next to one another on a bench having a conversation. ...i think it is great particularly with me being so far away. i would have liked to have done more Second Life classes. helps me to feel engaged ...the fact that you can fill a classroom with students and lecturers who are in various far flung corners of the world is huge ...and being in Second Life you feel more a part of the proceedings than you would in an actual classroom ... Better than the VLE this is like being there ... the VLE is like sticking an essay on a wall and then waiting for a response.

The first student clearly has no time for the virtual world, and sees no advantage of it over the VLE; and both of them seem to her inferior to the face-to-face experience. She made the point elsewhere that *Second Life* (and by extension any virtual world where text-based chat is the norm) just felt like a lot of writing. This is an interesting example of how the multimodal nature of virtual worlds can be apprehended differently by different people. What for one is a natural-feeling form of conversation, taking its place in proportion within the 3-D representation of environment and social action, for another can completely dominate the multimodal mix, feeling like a burdensome obligation to read and write, made more oppressive by the real time synchronous exchange which for others provides dramatic presence, a sense of social contact, and immediacy of feedback.

The students on the MA ICT in Education programme were generally enthusiastic, but some also had reservations. This selection of comments from reports made on the experience gives a sense of some of their reactions:

In all honesty, I felt I learnt more from the single 'lecture' in Second Life than I have done through the weekly discussions on Blackboard. That's not to say Blackboard is of little use or Second Life is a revelation in terms of teaching and learning: the fact it was face-to-face and as close to a real lecture as we have had on this module made a great deal of difference.

(G's report)

When I got there were a few people already there so I spent a bit of time talking to them. It was good to bump into other people who were in the same boat as me. [...] It was good to see avatars helping each other to learn new tricks by giving each other instructions using the chat facility and also showing each other how to actually do something.

(Student report, I.)

The Second Life was a good experience but at times I found it to be very confusing when everyone started to say things at the same time. It was also difficult to know who you are talking to as many people gave their avatar a different name to their own.

(If's module debrief)

The following year, the experiment was repeated with the MA Media group, and included a session in *Second Life* in which the nature of *Second Life* as a learning environment was the explicit topic of discussion. This was a revealing and wide-ranging conversation, raising a number of new points. For example, one student raised the idea that the text-based chat produced orderly dialogue, since the texts were automatically ordered, and identified by the name of the avatar. There was, then, no possibility for people to talk over each other or interrupt; or for anyone to be confused about who said what. However, such an optimistic view contrasts with the perception of the last student represented above, who felt everyone was speaking at once (even though this is literally impossible with text-based chat). Other points were made for and against chat: positively, that it favoured certain kinds of disability, such as deafness, since it displaced the physical process of hearing in its provision for conversation; and negatively, that it erased some of the social and cultural markers of spoken voice, such as regional accent.

Another point raised by students related to the social space we used in *Second Life*. We chose to use ordinary social spaces (in this case, Education UK Island) rather than virtual seminar rooms. At least one of our students felt this was a more authentic social space than the bare seminar rooms where we would normally meet in RL. Here, then, is a tension: different judgments about perceived realities. For some students, seminar rooms may seem arid, artificial, cut off from the world outside, while the spectacular social spaces of virtual worlds, peopled with exotic avatars, dressed in bizarre furnishings and lit by picture-postcard weather may seem much more 'real', both socially and in terms of a visual modality. For others, the reverse may be true: the seminar room may be an authentic representation of academic seriousness, what they came on the course to find, a familiar, appropriate home for the academic genres of lecture, seminar discussion, research presentation they expect to find. By contrast, the spaces of *Second Life* may seem distracting, trivial, irrelevant to academic endeavour. In social semiotic terms, modality, or a claim to truth, credibility and authenticity, cannot be established by a text or authorial intention alone – it is a process of negotiation with readers, audiences, users. The same seems to hold for virtual worlds, seminar rooms and VLEs. In any case, if our choice of space in a virtual world is to use social spaces (rather than virtual academies and lecture theatres), then those spaces and their inhabitants will always be ambiguous (see Carr et al., 2010). Are the events going on there educational, playful, gatherings of hobbyists? Are they school trips, or time out, or extra-curricular? Are they ethnographies of online life, seminars, explorations of new media? The function is determined by the use, of course; but inflected by the cultural setting, and the loosening of the conventional topographic and other markers of academic life. However, we also found that ambiguity was reduced by clarity of planning, of session content and of structure, and by students' familiarity with each other, each others' avatars, and the location.

Finally, one student raised the question of the role of the teacher. He characterised it as a kind of orchestration in *Second Life*, observing the shift from the traditional 'stand-and-deliver' mode to a more conversational one, and from formal hierarchies to more vertical, informal structures. This kind of shift was also observed in the previous year by a tutor on the ICT in Education programme, who argued that *Second Life* provides a social space for students to meet in ways which go beyond the boundaries of the seminar or the course sessions:

TUTOR: *It's the synchronicity [of Second Life], but also the kind of interactions. I was quite 'jokey' with the students in SL. It changes your relation with them. I'm not entirely convinced by Blackboard. There's meant to be space for students to socialise but this isn't really used. People post, and a handful post a lot and engage in dialogue. When I was teaching the MA module last year, I got the impression that part of the reason students stayed the course was because they met other people. It seems to me that people do the course not because it will advance their career necessarily, but because they are at a stage where they need some intellectual stimulation. Part of the pleasure / meaning of the course is meeting others and sharing interests, sharing life dramas, and so on. But what is missing from blackboard, I think, is the sense of a class as a social entity.*

Virtual doctorates: supervising in *Second Life*

For a year now, I have been supervising a PhD student in *Second Life*. It is an appropriate environment for him in many ways: his research project concerns boys' computer game-play and culture; he followed the MA game module and *Second Life* seminars (although he is not a user of *Second Life* himself); and he works at some distance from London. In respect of this last consideration *Second Life* is functioning here, just as for some aspects of the MA module, as a 3-D, avatar-based VLE. In this respect, the comparisons to be made are with other forms of communication we use: phone, Skype video, or Moodle. The advantages seem to be, for this student, threefold. Firstly, it's synchronous, like Skype, but unlike the conventional VLEs. Secondly, it offers a sense of embodied presence which makes the conversation somehow more replete, more of an encounter, embellished with bodies, costumes, furniture, different locations (we have met at four different locations) (Figure 4). Thirdly, the text-based chat offers certain advantages. This last point is worth further consideration. It has practical implications: we can both save the chat-log, and have a verbatim transcript of the supervision session for future reference. It has certain affordances for the conversation. It is slower than speech in two respects: the typing is slower than speech; but also the conventions of this kind of exchange are more tolerant of pauses than spoken exchanges. There is, then, more room for reflection, digestion of the last point or question.

Finally, an interesting outcome, if only anecdotal, is that it seems easier to spend longer in *Second Life*. Telephone or Skype supervisions in my experience tend to last between 30 minutes and an hour. These *Second Life* sessions are lasting from an hour to 90 minutes, suggesting that the kind of immersion commonly attributed to online worlds and games may also be a feature of these sessions. This contrasts with the experience of the tutors in the *Second Life* MA sessions we documented, who found the experience intensive, even draining. What made those sessions difficult was the effort of group management, quite different from managing a group in a seminar room (Carr, et al., 2010). Immersion alone, however, may be an inadequate concept to describe the supervision sessions. Carr (in Carr, et al., 2006), in an essay on the RPG *Baldur's Gate*, distinguishes between *immersion* - a perceptual and imaginative investment in the game producing a pleasurable, trance-like absorption - and *engagement*, involving grappling with more challenging ideas and changing schemas. These supervisions would be best characterised by a combination, then, of immersion and engagement, with an emphasis on the latter, requiring attention to the content of the research discussion, the needs of the student, the coverage of the agenda, the planning for future work and sessions.

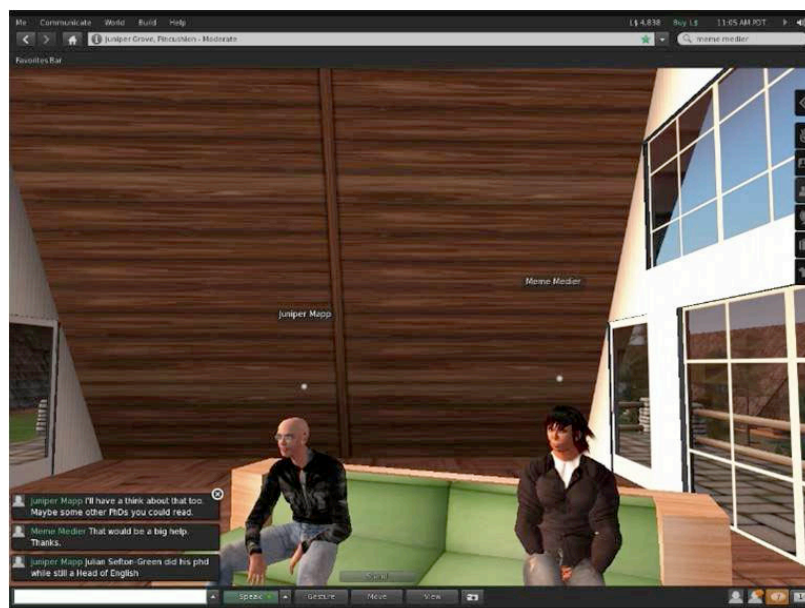


Figure 4. Doctoral supervision in *Second Life*

What seems much less of an issue is the question of role-play here. It is difficult to tell how our roles as teacher and learner are affected by avatar mediation or by the environment. Certainly something is different: meeting him in particular spaces, for example, even when these are my house in SL, makes a difference of a kind hard to specify. But there is nothing spectacular about the role-play; indeed, this feels much more like the kind of routinization of role proposed by Goffman (1959).

Conclusion: Shuttling Between Worlds

Our experience of teaching in *Second Life* allowed for instantaneous shuttling between worlds: we took our students on an instant 'trip' to an animation studio, for example, where they could hear a commercial animator operating in *Second Life* describe her company and its work. But more importantly, it seems clear that the real shuttling happening here is between the online and offline worlds. Some of the questions that seem to be necessary are:

- How does the avatar-based role play of teacher and student relate to their offline performance of these roles?
- How do the spaces in online learning relate to and differ from the conventional seminar rooms we use?
- How do the communicative practices of virtual worlds relate to those of 'meat space' and conventional VLEs such as Blackboard and Moodle? And to the spatial continuities and discontinuities of student attendance, both face-to-face and at a distance?
- How do the temporal structures of virtual worlds complement, or replicate, or disrupt those of other learning settings and situations?
- What does the multimodal ensemble of virtual worlds provide that the more impoverished modalities of conventional VLEs don't?
- How does a virtual world like *Second Life* contribute to the longer perspectives and trajectories of learning – the planning, assignment writing, development of student roles, identities and social lives, the construction of knowledge, the legitimization of learning?

My experience of virtual worlds as learning environments has been generally positive. But it has also on occasion been disorganised, chaotic and frustrating. The worlds themselves seem to offer valuable possibilities: new ways to provide synchronous exchanges, to overcome discontinuities of time and space, to explore and extend the dramatic performance of teacher and learner roles, to construct varied social spaces to complement the inevitably constrained environments of university buildings. However, the key to productive learning and teaching in many ways seems to be an old story. The critical factors are effective planning and pedagogy; active learning; time for reflection; and pitching of new challenges in the way both good game designers and Vygotsky (1962) suggest – to be both accessible and challenging.

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