



Unpacking frames of reference to inform the design of virtual world learning in higher education

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In the changing context of globalised higher education, a series of pedagogical shifts have occurred, and with them, a number of interactive learning approaches have emerged. This article reports on findings taken from a large-scale study that explored the socio-political impact of virtual world learning on higher education in the UK, specifically with regard to *Second Life*. Three dominant frames of reference emerged following analysis of data gathered from student and staff perspectives of their experience and use of *Second Life*, namely: (i) games and gaming media; (ii) disciplinary learning; and (iii) institutional space and ownership. Such frames of reference were evident in the practices of those involved in using virtual worlds, but it is suggested here that they have largely been overlooked in the literature in terms of their impact and how they may inform learner understandings. We argue that these frames of reference need to be recognised and located in the design and use of virtual worlds in higher education. Throughout the article we present our findings in relation to perspectives emanating from Europe as well as Australasia and the wider Asia Pacific.

Introduction

This article brings together data from a large-scale project that sought to understand the impact of virtual worlds on teaching and learning in higher education. While initial findings from a literature review related to the study (Savin-Baden, Gourlay, Mawer, Steils & Tombs, 2010) suggest that the use of pedagogically informed models may offer some purchase on the complex issues and implications involved, this article offers a collation of the findings from across the data sets indicating that particular frames of reference need to be acknowledged when adopting the technology.

Learning in virtual worlds such as *Second Life* has received significant attention to date. Research and academic discourse across the UK and Europe, as well as Australasia and the Asia Pacific, has explored interaction in virtual worlds, the nature of embodiment in multiplayer games and virtual worlds, as well as the impact of immersion in these environments on learning (e.g. Kang, Kim, Choi & Park, 2007; Mount, Chambers, Weaver & Priestnall, 2009; Richardson & Newby, 2006). Academics have investigated the potential of virtual worlds for offering new educational approaches and learning designs (e.g. in the UK, de Freitas & Neumann, 2009; in Australia and New Zealand, Dalgarno, Lee, Carlson, Gregory & Tynan, 2011; in New Zealand, Thomassen & Rive, 2010; Winter, 2010; in Hong Kong, Penfold, 2008). In Australia, learning affordances of virtual worlds have been examined (Dalgarno & Lee,

2010), and similarly, in the UK, Warburton (2009) has highlighted their potential to create effective settings for learning along with the barriers to their use, with a specific focus on *Second Life*.

Despite the range of research being carried out, relatively few studies have attempted to comprehend the multiple personal perspectives brought to bear on the learning encounter, including how such perspectives influence the ways in which tutors make pedagogical design decisions and students make sense of and respond to learning in virtual worlds ('tutor' is used in this article to refer to academic teaching staff or lecturers at higher education institutions). In this article, we draw on three distinct but inter-related studies that have explored the socio-political impact of virtual world learning on UK higher education. The focus of the grant proposal for the study was on examining the student experience, learner identity and pedagogical design, with a particular emphasis on *Second Life*. However, this article presents findings that emerged across the three studies, and which also seem to reflect the arguments proposed by Dalgarno and Lee (2010), who suggested that future research needs to seek to provide a better understanding of the relationship between virtual worlds and their potential learning benefits. Considering relationships and their influence(s), we argue here that there are multiple frames of reference which inform students' and academics' responses to the design of and experiences of using virtual worlds as learning technologies, but as yet these are seldom realised in curricula today. Three particular frames of reference were found to be evident across the three individual studies that were part of the large-scale study, and they provide the focus for this article:

1. Understandings of games and gaming media;
2. Disciplinary learning;
3. Institutional space and ownership.

We have considered O'Donoghue's interpretivist position on 'perspective' in our use of the term 'frame of reference' (O'Donoghue, 2007, p. 26). The notion of 'frames of reference' has been adopted as a lens "through which meaning is construed" (Mezirow, 1991, p. 4), and through which it is possible to see the impact of different stances, approaches and beliefs on the use of virtual worlds in higher education. Taken together, we assert that these frames of reference may help to inform understandings of the variation in approaches taken by students and tutors when making use of virtual worlds for teaching and learning purposes.

Relevant literature

Criticism is often raised about the use of virtual worlds failing to create effective settings for learning. Reasons cited for this are diverse, as reflected in the writings of authors from the UK, Australasia, the Asia Pacific and elsewhere. Such criticism includes ease of access (Herold, 2010), weighing up the relative advantages and disadvantages of virtual worlds against other available (e.g. non-3D) alternatives (Lee, 2009), and ensuring that pedagogical initiatives drive the implementation of virtual world technologies rather than the 'university' (Waycott, Bennett, Kennedy, Dalgarno & Gray, 2010). Noble (2001), Reeves (2002), and Oliver and Herrington (2003) have called for a re-engineering of the concept of learning design as opposed to just a simplistic repackaging of course content into electronic media formats. McWilliam (2005) similarly contends that new possibilities for teaching and learning necessitate a

rethinking of curriculum design; new technologies themselves cannot be relied upon to change anything. It would seem then that attention has been centred on the relationship between the pedagogy and the technology rather than the multiple perspectives that individuals bring to the learning encounter based upon prior experience, knowledge, and the influence of culture and world view (Gergen, 2003). It is examining how the student and tutor participants described, explained or otherwise accounted for their actions, interactions and experiences within *Second Life* with which this article is most concerned. In the subsections below, we proceed to review extant literature within the field that relates to the three identified frames of reference.

Understandings of games and gaming media

Play has been recognised in both the schools and higher education sectors as being a powerful means of engaging learners (Bruner, 1990; Dewey, 1938; Gee, 2003). Recent multi-user educational games such as *Quest Atlantis* (Barab et al., 2007) and *River City* (Galas & Ketelhut, 2006) have embraced play as a key component of learning. While play has been central to discussion and explorations of virtual reality and serious games, it is less prominent within the virtual worlds for higher education arena. Our contention is that there is a complex range of perspectives that needs unravelling in order to understand personal responses towards learning and play, considering the influence of 3D gaming and creating learning in virtual worlds that specifically employs a gaming pedagogy, or not. The broader international literature is certainly rife with suggestions that the user's attention is captivated in-world, and that this can result in a sense of immersion or presence (in North America, Robertson, Czerwinski & van Dantzich, 1997; Steuer, 1992; in Europe, Childs, 2010; Mikropoulos & Strouboulis, 2004; Mount et al., 2009). The review conducted by Mount et al. (2009), in particular, explored immersion in 3D virtual worlds. The research began by looking at the relationship between immersion, presence and engagement based on previously published studies. The outcomes of this exploration were then used to code the results from student focus groups in which participants were asked to explain their understandings of immersion and engagement with respect to a particular set of learning activities. The authors put forward the argument that

The clear danger... is that educators expend significant resources in developing learning spaces and learning activities in 3D virtual worlds that fail to engage learners properly because inadequate account of what it is to be engaged in a 3D virtual world has been taken, and the factors that prevent and obstruct engagement in such environments have not been assessed. (Mount et al., 2009, p. 40)

Mount et al.'s review draws on a number of interesting and useful sources, but does not entirely succeed in unpacking and delineating terms such as 'immersion', 'engagement' and 'presence' in ways that can be generalised or used specifically in relation to 3D virtual worlds. Further, the relationship between digital games and educational uses of virtual worlds has been charted explicitly in the UK literature (e.g. Dittmer, 2010). Yet, there are challenging elements to these relationships. Firstly, the implication of continuity between digital games and virtual worlds appears to create a demographic 'black box' of sorts (see Law, 1992), wherein the translation of gaming elements, practices and literacies to the virtual world domain is assumed rather than thoroughly investigated (e.g. Toro-Troconis, Meeran, Higham, Mellstrom & Partridge, 2010). Secondly, the assumed continuity between digital games and virtual worlds tends to eradicate other possible interpretations and positionalities. For example, several UK authors have acknowledged the contentious game/non-game status of a

virtual world (e.g. Carr, Oliver & Burn, 2010; Livingstone, 2007; Toro-Troconis et al., 2010), yet it is rare that alternative conceptualisations are looked upon as being significant and useful.

Disciplinary learning

Although there is a body of literature that reflects diverse disciplinary use of virtual worlds (as exemplified in the UK by Savin-Baden, 2010a, 2010b), there are few expositions of the complexities of the use of *Second Life*, or indeed, transdisciplinary research studies in this area. Yet, other studies might be overlaid to assist our understanding of how responses to disciplinary learning using *Second Life*, beyond the design of specific learning activities, may be examined. Understanding discipline-based pedagogy, we believe, requires more than just paying attention to the design of the learning activities. It calls for a recognition and understanding of the impact of disciplinary norms and values and the way in which these are played out through teaching. Moreover, as UK academics Jenkins and Zetter (2003) argue, disciplines shape the nature of pedagogy, and such pedagogies reflect the practices and culture of the discipline. Consequently, teacher knowledge and beliefs about what to do, and under which circumstances, can affect how students learn particular subject matter. Translating the disciplinary traditions and understandings individuals bring into virtual world learning is complex, not always transparent, and thus susceptible to misinterpretation. Yet Chee (2007), writing from Singapore, discusses how virtual worlds provide experiential spaces in which users learn their subject area through new and creative ways of doing, observing the outcomes of their actions and reflecting upon these to further their disciplinary understandings.

Shulman's (2005) work in the USA provides a useful framework for understanding the translation of disciplinary understandings through teacher knowledge, which he describes as several layers that include both subject knowledge and pedagogical knowledge. From a learner perspective, Trowler and Trowler (2010), in their review of the international literature on student engagement, identify three dimensions of engagement, namely student perceptions of their own learning processes, engagement with structure and process, and understanding of their learner identity. However, there does appear to be a decontextualisation of teaching methods and technical developments from both the learners and the disciplines, resulting in a worrying trend towards ignoring the particularities of what can be understood about conveying disciplinary learning (Becher & Trowler, 2001), along with the assumption that teaching and learning are necessarily the same thing.

Institutional space and ownership

Although there has been discussion about the relationship between the use of *Second Life* as a social space and its use as a higher education learning space, there have been only isolated pockets of research taking place on this topic (e.g. in Europe, De Lucia, Francese, Passero & Tortora, 2008). As noted by Temple (2008, p. 239), the university's use of space is intimately connected to the student learning experience, and thus the implications of spatial practice should be carefully considered. We suggest that as new spaces - including virtual spaces - emerge in higher education, they must be shown the same regard. What the literature has so far highlighted is that understandings of the use of space, along with the impact of representations of space in virtual worlds,

remain an area worthy of attention (e.g. from Singapore, Sourin, Sourina & Prasolova-Førland, 2006; from a UK perspective, Minocha & Reeves, 2010).

There have been a number of studies on proxemics in virtual worlds in the North American literature (Beale & Creed, 2009; Särkelä, Takatalo, May, Laakso & Nyman, 2009; Yee & Bailenson, 2009), and several studies have explored issues related to identity - although the latter is often conceptualised in diverse and competing ways (Dickey, 2005; Herold, 2010; Peterson, 2006). While some parts of the literature inform understandings of spatiality in virtual worlds, these do not extend far enough in terms of examining how teachers and learners approach, utilise and make sense of spatiality and spatial practices.

As a result of the difficult issues in the literature that highlight a tendency to neglect the impact and complexity presented by multiple personal perspectives on virtual worlds and their use for learning and teaching, we set out to bring together the work of the three studies in an effort to examine the challenge of pedagogies and practices, using virtual worlds, 'in action'. Hence this article examines the ways in which *particular* frames of reference relating to virtual worlds might affect the way learning and design are approached in higher education. Specifically, the following questions were investigated:

- * How do perspectives articulated around gaming and virtual worlds influence expectations and engagement with *Second Life*?
- * What disciplinary learning issues are prominent for students in their use of *Second Life*?
- * How do tutors' perceptions of ownership of space within *Second Life* inform approaches to pedagogy?

Methodology

Research design

The three studies have each made use of different qualitative methodologies, including case study (Simons, 2009), narrative inquiry (Clandinin & Connelly, 2000) and constructivist grounded theory (Charmaz, 2006). While separate in their study design, examples of data from the three studies have been brought together for the purposes of this article to form a 'synthesis' through a constructivist lens. Thus both the experiences and structures reported upon by research participants have been examined in context. This synthesis of such accounts has demanded naturalistic approaches to the translation of field data and emerging concepts from the individual studies into one another, thereby evolving overarching concepts. We have termed this process '*participatory action synthesis*' (Wimpenny & Savin-Baden, in press), which we explain in more detail below.

Participatory action synthesis

Participatory action synthesis is valuable as a methodology for synthesising primary research data from associated studies because of its explicit participatory element and the way in which it allows for the collation of data through multiple perspectives. It is a collaborative approach to data analysis, synthesis, interpretation and knowledge construction that enables the generation of data and results for communal analysis.

More than purely combining qualitative data sets from across the three studies that form the basis of the present research, participatory action synthesis has provided a means of integrating forms of knowledge and of making (meta-)interpretations between the data sets. This was accomplished through a team process of analysis, synthesis and interpretation, whereby themes and subthemes that emerged from the data were re-examined and renegotiated by the research team, which in turn led to a considered translation of concepts into a new whole.

Important features of the synthesis process included the research team:

- Focussing on research questions that transcended the discrete studies;
- Having access to all the primary data from the three studies;
- Working with data across the whole data set;
- Taking a constructivist stance.

Data collection

Data were gathered over an 18-month period by three PhD students (who were themselves familiar with both teaching and learning in *Second Life*), through individual and group interviews with students and tutors. Known experts who had extensive experience of *Second Life* teaching and research were also interviewed. This included 90 interviews, conducted individually, in pairs and through focus groups, as well as over 130 hours of observation. Table 1 provides more detail regarding the discipline, activities undertaken in *Second Life* and profile of staff and students included in the data set. Research sites included higher education institutions across the UK. This enabled the research themes to be explored and the impact of pedagogical design to be studied across both disciplinary and institutional boundaries.

Data analysis, synthesis and interpretation

The participatory action synthesis process involved simultaneous phases of data collection and inductive approaches to analysis, building on the reciprocal translational analysis (RTA) methods as outlined by Noblit and Hare (1988). This work was carried out initially at the individual level by the three PhD students as they collected the data, and then at the group level, with involvement of supervisory team members, in order to examine and share the data sets and to compare and integrate the findings constructively.

The synthesis process consisted of cycles of focused action and reflection. The steps undertaken included the following:

1. The primary data (sets) were read by the research team within an agreed timeframe, with accompanying contextual information regarding the circumstances around why, how and when the data were gathered.
2. Analysis involved comparing and examining the relationships between data sets, including listing and organising themes to develop first- and second-order themes. Themes identified from across the studies were then developed.
3. Next, the emphasis was shifted from comparison and examination of relationships between themes and team members' perspectives, to integration of themes. At this stage of the process, the research team was able to identify what could be said about the overall data sets.

Table 1: Details of data set

Subject discipline (level; mode)	Virtual world learning activities	Students	Teaching staff
Computing (undergraduate; on campus)	Development of media production skills through 3D modelling, DVD production and machinima production	3 females (aged 18-24); 13 males (7 aged 18-24, 6 aged 31-40)	2 tutors, 1 male and 1 female, both highly experienced technical developers and tutors in <i>Second Life</i>
Chemistry (undergraduate; on campus)	3D modelling of objects pertaining to the discipline (e.g. atoms, DNA strands)	Research carried out with staff member, thus no detailed student profile information available	1 male tutor, highly experienced in teaching in <i>Second Life</i>
Education (postgraduate; distance)	Exploration of educational applications of <i>Second Life</i> through seminar discussions and game-based learning	Mature students, often mid-career professionals	6 highly experienced practitioners in the fields of educational theory and practice, 4 of whom were female and 2 of whom were male
Employability (undergraduate; on campus)	Development of employability skills through project management in-world	6 females (aged 18-24); 8 males (aged 18-24)	2 male tutors, a course leader and a lecturer, both highly experienced in designing in <i>Second Life</i>
Environmental health (postgraduate; on campus and distance)	Risk management development skills through simulated accident investigations in <i>Second Life</i>	9 females (7 aged 25-30, 2 aged 31-40); 3 males (2 aged 25-30, 1 aged 41-50)	1 female tutor, a highly experienced developer and designer in e-learning who also used to be a practitioner in environmental health
Geography (undergraduate and postgraduate; on campus)	Exploration of the relevance of geographical concepts to virtual worlds through in-world field trips	3 females (1 aged 25-30, 2 aged 31-40); 11 males (8 aged 18-24, 1 aged 25-30, 2 aged 41-50)	1 male guest lecturer experienced in <i>Second Life</i> research, but with no prior experience teaching in <i>Second Life</i> ; 2 male tutors with limited previous experience of teaching with <i>Second Life</i>
Information science (undergraduate and postgraduate; distance)	Exploration of uses and cultures of virtual worlds through in-world discussion groups and field trips	4 females (2 aged 18-24, 1 aged 31-40, 1 aged 51-60); 6 males (2 aged 18-24, 3 aged 31-40, 1 aged 41-50)	1 male tutor, highly experienced in researching and teaching by distance in <i>Second Life</i>
Theatre (undergraduate; on campus)	Theatre practice in <i>Second Life</i> through productions of performances in-world	2 males (aged 18-24); 2 females (aged 18-24)	1 male tutor experienced in <i>Second Life</i> ; 1 experienced female theatre practitioner teaching with <i>Second Life</i> for the first time

Figure 1 illustrates the process used to locate knowledge gaps by making connections between findings and themes, moving beyond breaking down, reassembling and describing the findings to attempt to offer new forms of representation, contextualised by the literature, as suggested by Major and Savin-Baden (2011).

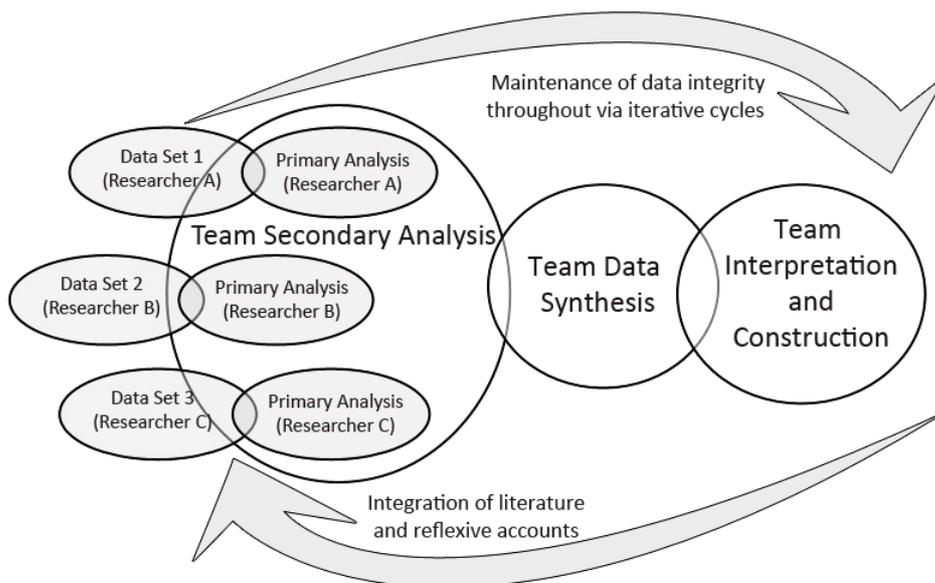


Figure 1: Participatory action synthesis process

Ethical approval

Approval was obtained from the research ethics committee at Coventry University and negotiated with all other university research sites.

Evaluation criteria

We acknowledge that the researcher, as a subjective individual, plays an integral part in the data analysis process (Finlay & Gough, 2003; Smith & Deemer, 2000). Thus to ensure rigour when conducting the participatory action synthesis, special attention was paid to:

- What was not said, and ensuring shared views were not privileged;
- What expressed realities were accepted without any scrutiny;
- Which experiences/ opinions initially seemed improbable, and what conditions might have shown those to be real;
- What contradictions were revealed.

Findings

The findings presented here reflect the frames of reference that emerged through the participatory action synthesis. It should be noted at the outset that these 'frames' were not imposed on the data, but rather emerged as issues of tension across the studies. While other cross-study themes are present, it is these frames of reference that stood out to us as being most poignant and are therefore reported here.

Understandings of games and gaming media

In exploring the frames of reference articulated around gaming and virtual worlds, three elements of the relationship are presented:

1. What meaningful expectations and practices are translated from digital games to virtual worlds?
2. To what extent are digital games a universal frame of reference for situating virtual worlds such as *Second Life*?
3. Is the implied continuity between digital games and virtual worlds reflective of participants' perspectives?

In each case, these frames of reference were derived from students with some degree of gaming history (although this was also diverse), yet the relationships between digital games and virtual worlds were not straightforward. Similarly, these frames of reference were not always mutually exclusive.

Within our data, seven references to digital games emerged: console first-person shooters (FPS), online FPS, beat-'em-up/fighting games, online casual games (e.g. *Facebook* games), role-playing games, simulation and world builders, and virtual world platforms (both gaming and metaverse). Individuals' prior experience of gaming was varied, as was how that experience was translated from digital games to virtual worlds. Frames of reference appeared to influence *behavioural norms* of nearly all the students in the study, as seen in the following remark made by one mature-aged, female student studying part time on a masters-level geography course:

I've only ever played games when you beat people up. So someone would be in front of me and I'd be like, "Oh, how do I hit them, how do I hit them?!"

Here, the individual's previous gaming history is rooted in a specific *type* of game (a beat 'em up), where behavioural norms (such as hitting) are quite specific. Translating this behaviour into the virtual world of *Second Life* therefore gave rise to issues. Not only were there disparities in systems of action (i.e. *how* to hit someone), but such actions carried differing significance within much of *Second Life* as compared with a fighting-oriented digital game. While orientation sessions may aim to support students' understanding of how learning is designed or intended to occur within the virtual world, the translation at an individual level can still be problematic, particularly as many students in the study expected *Second Life* to be a gaming environment.

Frames of reference were also evident in students' estimations of *personal competence*:

I used to play [*The Sims*], but I was never good at it... and so, when they were, like, "Oh, you're going to be able to build a set and you're going to," I was, like, "Oh [expletive], it's like [*The Sims*!]" And it was, it was just daunting to think that, like, I was going in this place.

Here, a digital game norm, drawn from a frame of reference (*The Sims*), influenced both the expectations of action in-world as well as this female student's perceived personal ability to successfully complete those actions. Previous experiences with *The Sims* appeared to have lowered her confidence in the possibility of a positive engagement with *Second Life*, leading to anxiety on encountering it as part of the theatre degree she was pursuing full-time. The sense of apprehension evident in this

quote highlights how a gaming history can affect motivation and self-belief in a deleterious manner when previous experiences have been difficult or challenging.

In addition to the diversity in the types of and ways in which digital games affect engagement with the virtual world, we found virtual worlds were *positioned* by student participants in a variety of ways. These included the virtual world as a digital game, a non-game, a replication of the physical ('real') world, an augmentation of the physical world, or a distinct and separate fantasy world. The link to digital gaming was sometimes made explicitly, as this next quote from a male information science student (who also held a tutor role) illustrates:

I was probably one of those people that, prior to the course, that was guilty of thinking that virtual worlds were just games, effectively.

In this case, the 'game' as a frame of reference is applied to understand the virtual world. The use of 'guilty' and 'prior' are of significant interest as they are indicative of a shift in perspectives between frames of reference - that is, away from games towards other possibilities. Similar shifts were observed among numerous other students who also began from this position:

Well, I keep saying RPG [role-playing game] because I do see *Second Life* as an RPG to some degree. Um, it's not a game, I know that, I'm very aware of that, but it is in that same category.

Yet, here the continuity between digital games and virtual worlds is less clear. From a *cognitive* perspective what we are seeing here is the individual locating the virtual world in relation to his/her cognitive frame of reference, and trying to make sense of it based on prior learning and experience (Ausubel, Novak & Hanesian, 1978).

While some students' positioning of the virtual world resonated with the perceived attributes of a game, others attempted to relate to the virtual world by drawing upon a hybrid framework of digital games and other media:

[*Second Life*] seems to me like a sort of mix between *Facebook* and *The Sims* or something like that..

The permeability of '*fantasy*' and '*reality*' in frames of reference was more apparent here, with the idea of a virtual world being a coalescence of a social network and a digital game. The type of digital game being drawn upon became increasingly relevant also, as did the notion of fantasy simulation represented by *The Sims*, and connectivity with other 'real' people as reflected through social networking sites like *Facebook*.

It became clear that frames of reference were particularly murky at the interstices between gaming and non-gaming media, and fantasy and reality. The virtual world appeared to be part 'chimera' (like a clone - Friese, 2010, p. 145) and part 'shape shifter' (potentially like its users - Savin-Baden, 2010a, p. 35) - a positional conundrum. Thus although the frame of reference related to games and gaming media tended to shift as the students' experience moved and changed, there was a sense that students who had previously experienced gaming held prior conceptions that virtual worlds would be like a gaming environment. Such frames of reference at an individual level were also affected by the particular disciplines in which virtual worlds were being used; it is this aspect to which we now turn.

Disciplinary learning

Disciplinary learning is used here to refer not only to the impact that acquiring disciplinary knowledge, skills and attributes has on learning and teaching, but also to the way in which disciplinary traditions and beliefs have an effect on what it means to learn within a given discipline.

The findings from the data revealed that *initially*, many of the students interviewed did not make the connection between what they could gain and how they were expected to learn about their discipline when using *Second Life*. For example, individual frames of reference students appeared to hold and draw upon related to pre-existing images, knowledge and experience of the particular discipline, with varying degrees of relevance. What was of note here was whether tutors were able to help students make connections between complex subject matter and constructive ways of learning in the virtual world, especially if the tutors themselves were uncertain of the learning technology that required a radical transformation of their practice (Kalogiannakis, 2004). In our data, we found students and tutors framed their experience alike, in that many were not able to make use of *Second Life* intuitively. Some showed signs of reservation or resistance, as commented upon here by an e-learning designer:

Prior to this I'd tried it out at home on the PS3 [*PlayStation 3*] for kind of five minutes; I'd tried *Second Life* for minutes and kind of run away screaming, "This is just rubbish!"

While evidence of resistance varied depending on the individual and level of the course, there was a tendency for an enhanced and applied understanding of learning in *Second Life* to emerge as students became more familiar with the application, as demonstrated in this quote from a rather sceptical environmental health management student:

But it was definitely better than I thought, easier than I thought. Although yeah, in the beginning I thought, this is rubbish, I'm not going to learn anything from this and that changed. ... They're not going to make us do anything that's going, that's going to have no benefit or no use. So yeah, definitely changed my mind on that.

Similarly, a student studying a second-year employability module shifted her perspective from not being able to see the value in the use of *Second Life* to having a more insightful outlook:

I don't think necessarily I would get a job somewhere else because I'd taken part in *Second Life*. But I could still say I demonstrated teamwork, I demonstrated organisational skills and presentation work, and whatever, and so those are the positives for me.

Here we see a clear link between the use of *Second Life* and the values implicit in the discipline - teamwork and presentations, for example. Yet in contrast, the framing of experience shared by a performing arts student, who is commenting upon engaging in role-playing activities within *Second Life*, suggests more of a struggle to make disciplinary links:

I was a bit like, "That's, that's not theatre!" but then, I was left working with it for a while and that was it, it is, it's, in its own little way, it can be used as a performance tool, as well as a lot of other things.

What became apparent by such frames of reference was that the use of *Second Life* did not provide immediate disciplinary 'fit'. By this we mean that when students came into these learning spaces, they did not immediately recognise the disciplinary shape of them, nor were they able to marry them with previous experiences of disciplinary values and discipline-based pedagogy. Being introduced to learning in a virtual world was framed as territory that was seen as *troublesome*, as in foreign and conceptually difficult to understand (Perkins, 2006). Certainly it would appear that conveying the purpose and the design of the *Second Life*-based activity to students in advance arose as a repeated challenge for tutors. What seemed to happen was that as barriers were overcome, frames of reference shifted. Former disciplinary images/definitions became more refined, and learning was viewed as more comparable to that of other real-world 'classroom' activities such as group or project work.

With the above said, there were some examples that demonstrated a clear fit between disciplinary learning and the use of virtual worlds. One such example was the use of *Second Life* to simulate a disaster scenario for environmental health managers. In this instance, the potential benefits of *Second Life* were clear: an in-world simulation provided a safe but complex space for trainees to practise their future professional roles, and the transferability of the training into the 'real world' was obvious. As two students acknowledged:

Second Life was a good starting point. Great to try things out first before doing it in reality. It's safe preparation for placement. I'll be able to bring some skills in and try them out again.

[It] was a bit like a role-play, because we don't get to do any kind of practical things [sic] really, or that many, so as it was, it was a good kind of tool to use, where we could actually put skills into practice without actually physically having to go and do it, and we've got not [sic] anything like that, so that was, that was really good.

Second Life was framed as a space that provided opportunities for the development of disciplinary values and capabilities (such as 'soft'-skills practice, building, designing) within a specific discipline. Yet, as Savin-Baden (2008) questions, does it also provide scope for the level of critique necessary for life and work? Tutors and students tended to build and visit spaces within *Second Life* that reflected their discipline, and such spaces were designed within disciplinary assumptions. However, our data also suggest that the intricacy of how disciplinary learning may be conveyed warrants more thoughtful consideration beyond how the environment and learning activities are designed. Virtual worlds offer new possibilities and the impetus to do things differently, while also confirming and imbuing a sense of disciplinary learning. Nonetheless, at the same time, understandings of games and ways of learning within a discipline are also affected by the institutional spaces into which they are placed, and it is this we next explore.

Institutional space and ownership

Our findings pertaining to institutional space and ownership have been drawn from interviews with tutors involved in teaching in *Second Life*, and they represent the complex understandings of ownership that frame the rationales for and approaches to the use of the technology. Here, we draw upon Lefebvre's (1991) notion of social space - specifically, space as a means of control, through which some understanding of ownership is developed. Lefebvre's constitution, along with territorial, disciplinary

and institutional spaces, impact upon spaces for learning by preventing or enhancing their creative development. Yet, an understanding of the diversity and complexity of learning spaces can inform the ways that they are (re)created, managed and owned.

In our data, tutors often viewed *Second Life* 'islands' as encompassing multiple frames of reference, thus precluding an easily discernible notion of ownership, and it was evident that ownership seemed to relate to 'everyday life' and spatial practice. According to Lefebvre (1991), social space may be seen as comprising a conceptual triad of spatial practice, representations of space and representational spaces. Spatial practice signifies the way in which space is produced and reproduced in particular locations and social formations. Yet, in the context of *Second Life*, it would seem that such a formulation of space has created different and diverse spatial zones, along with imaginary geographies. For the purposes of this article, two distinct but interrelated frames of reference are delineated: *Second Life* as an institutionally owned space and *Second Life* as a student-owned space.

Assumptions of institutional ownership in virtual worlds have often been linked to the representation of space and the recreation of physical university buildings within the virtual environment (see, for example, Jennings & Collins, 2007; Savin-Baden, 2010b). However, as representations of space have altered throughout *Second Life*'s lifespan, with a trend towards creation of new fantasy spaces as opposed to recreation (Kirriemuir, 2010), assertions of institutional ownership have altered too. For participants in this project, the framing of *Second Life* as an institutionally owned space often related to the level of control exerted by the institution. This was couched in terms of scalability and top-down implementation, as opposed to bottom-up, or 'un-risking', of virtual world practices. In terms of the findings from our study, *Second Life* was largely seen to be exempt from such 'political' control thus far, depending on the institution. Nevertheless, the introduction of greater control was considered to be inevitable, often paralleled to the scaling of the learning management system. Thus ownership and control in this sense was viewed through the establishment and enactment of networks and processes within the institution.

From a different perspective, the structuring and formalising influence of the institution through such control and ownership was also recognised, as articulated by one tutor:

It's somewhere where you get that nice crossover between the informal and the formal... You know, it's one of those places where you can see the bringing together of those two spaces.

Here, *Second Life* was framed as a space in between the formal (the institution) and the informal (social media), as a way to bring the two spaces together. However, the control and authority implicit in this quote characterise the educator's views, implying an ease of unity, which we suggest does not exist in practice, where routine and ritual prevail. Tutors' perceptions of student ownership of space in *Second Life* represented a range of complexities, two examples of which are now presented.

Staff often promoted the use of *Second Life* as a way to engage with students in a 'shared', informal space, although in the case of one tutor, his students' social use of *Second Life* was perceived to be a key factor in safeguarding *their* ownership as opposed to the institution's ownership and control:

But when they [students] go down to the student union bar then, well that's fair enough, they can do what they want to do. They might be chatting about the learning stuff, discussing assignments - that's their environment, their space, and that's what I think of *Facebook* as being like. And in a way that's what I think of *Second Life* as being like. It's that it's not a space that we [tutors] can intervene in too forcefully, or interfere with. You know, it's fine for us to pop in every now and again, but - a sense of ownership I guess it is, over different environments.

The comparison of *Second Life* to the student union bar and to *Facebook* - seen as both learning and social spaces, but definitively student-owned spaces - for this participant, was seen as demanding a 'light touch' from the institution. Students did not actively exert control or authority in the claiming of *Second Life* as 'their' space; rather, this participant saw it as being the institution's responsibility to ensure it did not encroach on that ownership.

An alternative view of ownership emerged through the use of other islands than those belonging to the educator or institution for learning activities. These activities were often referred to as 'field trips', thus automatically situating the relevant *Second Life* spaces as owned by another. However, this also represented a further claim to institutionally owned space. The use of the term 'field trip' automatically presupposes that there is a space to leave that is *not* in the field'. In naming the visit to another island's space as a field trip, the tutor and students' own institutional island becomes the *Second Life* 'home' from which they leave and to which they will return. This was viewed both positively and negatively. Field trips in *Second Life* offered a way to explore other in-world spaces and a means by which to engage with work produced by others. The fact that many islands are public made this sharing of space and work possible for many of the participants in the study. Yet for one tutor working in a science-based discipline, the use of other *Second Life* islands was perceived as a challenge to student ownership of space and of learning:

I do feel that the eye-candy aspect of *Second Life* can lead to a degree of 'tourism'. I want... to get students to modify the environment. To achieve their own ends... So it is important for me that they generate physical artefacts.

Here, student ownership of the *Second Life* space was supposed through the creation of the objects and the modification of the environment. Framing ownership in this way entails a move away from the ownership of physical space as discussed thus far (ownership of a *Second Life* island, ownership of the *Second Life* technology or platform as a whole) and establishes ownership as the enactment of spatial practices in Lefebvre's (1991) terms. When ownership is interpreted in this manner, students can be said to 'own' any *Second Life* space in which they are able to build - for example, public sandboxes, their institution's island and the sandboxes of other institutions' islands.

Discussion

The findings of this article indicate, in our view, that participants' multiple frames of reference can inform the use of virtual worlds for teaching and learning in higher education for staff through:

1. a recognition that positioning virtual world learning as akin to games is not particularly helpful to students;

2. an appreciation that students struggle to see the relationship between disciplinary values and the forms of learning and pedagogies presented to them through *Second Life*;
3. an acknowledgment that using virtual worlds for learning in particular ways can help students to learn about the cultural values of their discipline and signature pedagogies;
4. a realisation that there needs to be a balance between *Second Life* as a learning space and as a social space.

These key findings will now be discussed.

While our data analysis revealed that prior experience of gaming influenced certain students' reactions to being exposed to learning opportunities presented in *Second Life*, the range of responses suggests it is not easy to predict precisely what influence the positioning of virtual worlds as akin to games has.

The findings from Duffy and Penfold's (2010) study highlight that when learning in *Second Life* is positioned in terms of a game the learning outcomes may conflict with the intended pedagogical ideas, which is also consistent with the findings from our study. It was clear that while the use of game concepts was seen to motivate and assist students through the program of study, students expressed disappointment that *Second Life* was not as dynamic as other games they had played. This resulted in disjunction between educational gains and the social/play aspects of learning in *Second Life*.

On another level, a tension was apparent in terms of the perceived usefulness of learning using *Second Life*, including how willing students (and tutors) were to persist with usability hurdles when the technology did not match user expectations. Saeed, Yang and Sinnappan's (2008) (Australian) study utilising media richness theory may offer a useful lens through which to examine gaming frames of reference in their consideration of user perceptions of usefulness and ease of use. Similar to findings from our data, positions can shift when gaming frames of reference move away from games and towards other possibilities.

Ultimately, then, it appears the literature that implies gaming media and virtual world learning technologies are continuous - rather than merely contiguous - risks portraying a rather unsophisticated view of an extraordinarily complex and sophisticated set of relations, which includes prior experience, behavioural norms, expectations of personal competence, cognitive ability and the influence of context. Situating virtual worlds as an extension of games and gaming (either as a game or non-game) seems to exclude numerous other potential frames of reference that might assume primacy with specific users in specific places. The continuity of frames of reference between digital games as a media and virtual worlds as a media cannot be assumed - some participants in our study viewed virtual worlds as a type of game while others held alternate positions and meanings, and understandings were not necessarily translated in straightforward ways.

The findings in this study indicate that students struggle to see the disciplinary relevance of their learning in *Second Life*, and staff do not always realise the impact of discipline-based pedagogy on their use of *Second Life*. The consequence is that individually held disciplinary assumptions result in students holding different positions regarding professional understandings, which are not translated in

straightforward ways. Although the play elements and visual stimulus of *Second Life* are explored in the literature - see, for example, Edirisingha, Nie, Pluciennik and Young (2009), who report on the use of *Second Life* by archaeology students to explore aspects of civilisations that no longer exist, and Lang and Bradley (2011), who tell of how the technology can be used to allow chemistry students to visualise and interact with 3D molecular models - what remains hidden is the projection of disciplinary understandings, enabling students to see the relevance for their subject field. Such findings echo other studies conducted internationally, such as Penfold's (2008) study, which focused on the main challenges faced by tutors (at a hospitality and tourism school in Hong Kong) in designing and delivering disciplinary education using *Second Life*. In Penfold's study, when faced with unpredictable, open-ended and/or less-structured activities students reported being less engaged, even bored. The opportunity of learning in new and different ways was seemingly lost or missed.

Our findings also suggest that tutor confidence and competence in using *Second Life* within the disciplines were central to practical application and understanding. Practices within Australia, likewise, emphasise the role of the tutor as central. The Australian Flexible Learning Framework action research project titled 'Virtual worlds - real learning!' (Bradshaw, 2006) identified how the tutor needs to be fully present, engaged and alert; in addition, tutors need to be given adequate support as they venture into what, for many, is unknown territory, as both the guides and 'guardians' of their students. Our findings reveal that learning within *Second Life* can help students to learn their discipline, affording them opportunities to share cultural values and collaborate productively with one another. In this respect, our work reinforces the findings of other published studies (e.g. in relation to problem solving in clinical simulations, Rogers, 2011; language learning, Wang, Song, Stone & Yan, 2009; see also Hew & Cheung, 2010).

Thus what appears to be of prime importance when designing virtual world learning is not only knowing 'how to do it', but also how to do it well, under which circumstances and with whom, and how these can affect the way that particular subject matter is learnt. As Lim (2009, p. 6) argues, care should be taken to ensure learning environments are not just defensible from the perspective of the subject discipline, but also provide opportunities for learners to invest meaning (and therefore time and effort). Shulman's (2005) work on signature pedagogies is also useful here in terms of the tutor making learning expectations explicit to students and helping them foster social connections. Tutor decisions should reflect the underpinning pedagogy in action, and aid in promoting disciplinary values through implicit structures that can support development of professional beliefs and attitudes.

It also is interesting to consider what is *not* seen as a component of signature pedagogy. Data from our study suggest there were instances where participants framed disciplinary values within *Second Life* as offering "a good starting point" for "trying things out before doing it in reality". In other examples, students' framing of their experiences suggested the absence of adequate disciplinary 'fit'. The issue here is whether space and time has been made available to facilitate engagement in the necessary level of critique about what the learning intervention has offered and what has been achieved. If disciplines shape the nature of pedagogy and such pedagogies reflect the practices and culture of the discipline, how can use of a virtual world learning environment influence teaching practices and the methods by which future practitioners will be educated for their profession?

It is apparent that *Second Life* takes time to adapt to, and may be overwhelming, strange and troublesome (Bayne, 2008; Savin-Baden, 2010b); what was especially notable to us was how participants' frames of reference were modified or changed as a result of their action and experience within *Second Life*. Yet, we suggest that this may also relate to the impact of space and ownership on individuals. We submit that when designing learning for the disciplines within a virtual world there is a tension between, on the one hand, the desire to make best use of the creative space by capitalising on a sense of novelty and surprise (Jankowska & Atlay, 2008), and on the other, the need to be aware of expectations and reference points for the learner. As identified by Savin-Baden (2008), the opportunity to do things differently when designing for disciplinary learning within these new environments, in which there is less order than in traditional learning environments, forces a reconsideration of how learning spaces are to be constituted. Additionally, understandings of ownership play a role in how practitioners perceive virtual worlds as tools for learning, and how this can influence their pedagogy and learning design.

Yet the balancing of *Second Life* as a social space and *Second Life* as a learning space necessitates consideration of issues of ownership. Within the study, ownership (and associated themes of implied control and power exertion) emerged as a complex frame of reference that differed from individual to individual, and characterised different aspects of *Second Life*. Such a range of perspectives in turn raised questions about what is allowed or disallowed, including how tutors may seek to control and contain space. For example, *Second Life* was viewed by many participants as an institutionally owned extension of the campus, as a replicated classroom, and as a useful marketing feature. Such perspectives were due in part to the design of the space, but arguably were more a reflection of views of ownership framed by self-positioning. One tutor framed *Second Life* as offering a useful crossover space in which to bring together social media and the institution; in other instances, *Second Life* was framed as a type of game, or seen as both a learning and social space, but definitively a student-owned one.

Representations of space are, according to Lefebvre (1991), related to the relationships between the sites of production and the way in which signs and codes are used within those representations. These spaces in the physical world are conceived spaces and are the spaces of the planners and architects. In *Second Life*, however, 'real' spaces are not necessarily defined by physical-world aspects such as the design of buildings and the space that exists between and within structures shaped by the organisation's function and activity. Zhao and Elesh (2008) argue that the ownership of space also has to do with being in the right region, based on affinity, common interests, even rules and regulations - and yet, a sense of ownership of a space does not guarantee engagement in of itself.

However, what was also enlightening was that the institution exerted its influence more markedly, whereas students did not appear to be as overtly aware of, nor consciously exert, ownership. This is pertinent when examining the claim that *Second Life* promotes the levelling of power and control (e.g. de Freitas & Neumann, 2009). Arguably, spaces for learning within *Second Life* remain 'sites of enclosure', a term used by Taylor (1999, p. 11) to describe attempts by institutions to create contexts in which only the occupants define the rules and practices that govern internal operations. While not the only reason, such tensions arguably reflect an ethical/moral dimension facing institutions and educators regarding risk and dilemmas surrounding the troublesome of the Internet and world wide web, which prompts a retreat into familiar

forms of control. Such perspectives somewhat mirror Roth's (2010) concerns regarding political decision taking in terms of cyber security and selection of filtering systems, which she views as obstructing and threatening Australia's virtual world development. Yet the novelty of learning in an immersive world brings with it distractions, framed by one tutor as 'eye candy', and this can challenge assumptions about what learning should be and look like (Savin-Baden, 2008). For some students, the safety and security represented by institutional space is appreciated, but nomadic use of space also can be stimulating. Our findings demonstrate that tensions were experienced by tutors, who sought to push boundaries of structure and appearance and to encourage students to make wide use of *Second Life* spaces, yet also wanted students to get something from their learning, in ways they believed they knew best.

Conclusion

The outcomes of the participatory action synthesis we conducted across the three data sets from our large-scale study point to the fact that previous explorations of learning in virtual worlds have neglected to look more closely at frames of reference and how these serve to inform expectations. We simultaneously also recognise that frames of reference may interfere and/or collide with one another, with complex consequences during the student-tutor encounter. Our findings suggest that sound pedagogical decisions and careful consideration about the reasons for using virtual worlds are needed to ensure that the technology can be transformative in its application rather than merely being used as a replacement way of doing something tutors typically do (Hughes, 2005; Mount et al., 2009). Indeed, as Dalgarno and Lee (2010) contend, ongoing development of and investment in 3D virtual worlds for learning should be contingent on understanding how such environments provide advantages over other pedagogical techniques, including those offered by their non-3D counterparts.

Ultimately, what we have uncovered is complex, but positive. We propose that the relationship between digital games, social media and virtual worlds is often mutable. As a result, multiple conceptualisations can exist within a single group of students, which is both a challenge and an opportunity. On the one hand, we propose that multiple frames of reference will inevitably be brought to a learning and teaching situation, and that these will impact on action and understandings in ways that are not easily predictable - for example, simply aligning virtual worlds and games discursively and then arguing that motivation and engagement can be translated across the two domains is unlikely to provide a suitable 'remedy'. Conversely, we suggest that frames of reference frequently evolve, hybridise, combine, refigure or are reconceptualised temporally, and this can make learning and curricula less rigid.

There is no universal frame of reference based on digital games that makes for ease of access to *Second Life*. Further, without conveying the particularities of teaching within a specific discipline and questioning the contribution of *Second Life*, the expectations and assumptions students bring may interfere with disciplinary enactment. In addition, the self-positioning of tutors' perceptions of ownership of space can heavily influence their approaches to pedagogy. Overall, in light of the findings of this study, it is our belief that there is a need to see learning spaces and curricula as more fluid - our perspectives resonate with Bauman's (2009, p. 157) 'liquid modernity' and call for the destabilising and rethinking of time-honoured pedagogical practices.

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