Editorial: Out of this world

As guest editors, we have called this editorial *Out of This World* because, for many readers, that is what '3-D MUVEs' may seem like! The awkward acronym does not help. Fortunately, Nick Rushby, esteemed editor of this Journal, is open to new ideas. He readily agreed to our proposal for a special issue on the use in higher education of three-dimensional multi-user virtual environments (3-D MUVEs), sometimes called immersive virtual worlds. We decided to write a longer guest editorial than is usual in the *British Journal of Educational Technology* (*BJET*) in order to provide an overview, given that 3-D MUVEs are new to many for educational purposes.

Public interest in virtual environments has been stimulated by newspaper stories such as the one about the divorce case: the woman discovered that her male partner's avatar (virtual representation) had had virtual sex with a female avatar in *Second Life* (SL) (Steven Morris, *The Guardian*, November 15, 2008). Such tales emphasise the blurring of boundaries between the real or physical world and virtual worlds, whether or not we agree with Mark Lawson, writing in the same issue of *The Guardian*, that the industrialisation of daydreaming is ruining real lives, or that SL is a kids' dressing up box for alleged grown-ups! Media interest in aspects of virtual worlds continues unabated— witness the widely reported virtualisation of London's top shopping streets as a response to the 2008 'credit crunch' (Chris Gourlay, Virtual West End for cyber shoppers, *The Sunday Times*, December 28, 2008; Victor Keegan, The battle to rebuild London has begun, *The Guardian*, January 15, 2009). Social scientists have taken a more considered and knowledgeable view of avatars and their social life: see, for instance, Schroeder's (2001) analysis before SL was launched.

SL is by far the most widely used 3-D MUVE: it is accessible via the Internet and owned by Linden Lab, based in the USA. The company, founded in 1999, claims: 'It's our mission to connect us all to an online world that advances the human condition' (http://lindenlab.com/about). SL was opened to the public in 2003. According to Keegan (2008), SL was the third most popular social software application in the UK, after Facebook and YouTube, in terms of minutes spent using it. Well over 10 million people have registered as 'residents' in SL, with thousands more registering each week: 30–50 000 of their avatars are likely to be active (in-world, as they call it) at any one moment. SL is a social environment, not a game, although avatars can be very playful. Generally, users (sometimes called drivers) are *not* expected by the software to meet objectives or engage in battles or undertake quests and tasks as in most virtual games. SL as such contains no goal-driven rules, though residents may sometimes decide among themselves to play games with such rules. Accordingly, this special issue does

not deal much at all with gaming in higher education. Avatars in SL can do more or less whatever they like, including teaching and learning, except visit those islands where owners of the virtual land restrict access. An exception is the Teen Grid, a part of SL that is segregated and restricted in various ways to protect its users, who are aged 13–17.

Growing interest in learning in virtual worlds

Together with other Web 2.0 technologies such as Facebook, You Tube and MySpace that offer user-centred services and global social networking, with huge opportunities for people to learn from each other, 3-D MUVEs are starting to command attention in higher education. We think this may be because they offer opportunities for immersive learning. Seely Brown (2008) suggested that immersion was one of the principal ways in which the learning landscape could be transformed. For example, he said, we all learn our home language through immersion—and we desire to learn it. Virtual worlds in three dimensions may now enable us to learn by immersion in many fields, along with other learners. We can learn from and with them, in virtual space.

The number of universities that now own land in SL is hard to establish. Websites like http://simteach.com/wiki/index.php?title=Institutions_and_Organizations_in_SL that list islands do not include all that are active, and some shown may have become moribund. Probably over 300 universities, mostly in the UK and the USA, with some in Continental Europe, Latin America and Asia, have bought virtual land so far. These vary from active, frequently visited islands to empty, undeveloped ones. If a university has a presence in SL, in some cases, just a few academics and students may be involved, possibly only for the duration of a short-funded project. In other cases, permanent occupation is likely, perhaps with thousands of visitors each month.

If any confirmation of growing British interest in this field is needed, we note that Frances Bell of Salford University, Maggi Savin-Baden of Coventry University and Robert Ward of Huddersfield University recently co-edited a special issue, *Learning and Teaching in Immersive Virtual Worlds*, of the *Association for Learning Technology Journal* (*ALT-J*, Vol. 36, Issue 3) (http://www.informaworld.com/smpp/title~db=all~content= g906960349~tab=toc). The papers here complement well the *ALT-J* ones, which include seven from UK institutions, one from the USA and one from Australia. As editors, their aim was to publish current research, developments and ideas in educational applications of immersive virtual worlds, including massively multi-player games. They suggested that these worlds and games represent a paradigm shift in education. We think that *BJET* readers may take a similar view: 3-D MUVEs are unlike anything previously used, as Steve Warburton indicates in his paper (pp. 414–426 below), a critical history of technical developments in this field.

Kirriemuir (2008) pointed out that a 3-D MUVE such as SL, with millions of registered users worldwide, might be of interest to universities' marketing departments hoping to build up student numbers, and some of the first efforts were unashamed of promotion and the reproduction of the display of physical campuses (see, for example, http://

uk.youtube.com/watch?v=aFuNFRie8wA). Individual academics, however, seem to be using 3-D MUVEs for educational purposes, such as virtual laboratories and field trips, problem-based learning, group discussions, design teamwork and so on. Such initiatives try to take into account students' preferences and habits, and, typically exploiting aspects of immersion, aim to enrich their learning.

It may be too early to be sure that 3-D MUVEs are more than a flash in the pan for higher education: after all, plenty of other technologies have been used for education for a few years only to disappear. We recognise that this special issue of *BJET* may be at the very beginning of the 3-D MUVEs' potential development … or maybe the middle or even towards the end. We hope that reading through the wide variety of approaches represented here will not only help you to consider their position on the development curve, but perhaps enhance your ability to contribute to exploiting their potential in serving best your students' learning experiences. One of us (Salmon) attempts the risky business of identifying future pointers for exploitation of virtual worlds for higher education on pp. •• in this issue.

3-D MUVEs in UK higher education

Apart from the studies reported in this issue and in the *ALT-J* special issue, interest has been building up in using 3-D MUVEs for teaching and learning in higher education. We have not included all 3-D MUVE projects at this level in the UK in our review below, but for four years, from July 2003 to October 2008, the Eduserve Foundation funded snapshot surveys of UK higher and further education developments in SL. Kirriemuir (2007) reported nine kinds of SL use: some were still nascent, others under development, a few up and running. In the latest report, Kirriemuir (2008) summarised the returns from 46 institutions. He said, for example, that the University of Surrey was evaluating SL's potential for encouraging and supporting problem-based or enquiry-rich learning experiences and for encouraging immersion to help students to master unfamiliar situations. The University of Edinburgh was using SL as a tutorial space for learning about and discussing online identity and other topics within the MSc in e-learning, and as a social space for distance learning students and tutors to meet (see also Bayne, 2008). Several British universities told Kirriemuir (2008) that they were using SL as a research environment. For instance, the University of Sheffield was studying SL as a learning space, and at other universities, creative arts activities were being extended into SL. The University of Huddersfield wanted to use SL as an environment for virtual psychological experimentation. Some universities had postgraduate students studying SL as an environment for education.

The Open University set up Cetlment Island (the name was derived from the Centres for Excellence in Teaching and Learning or CETLs) in SL for research into teaching and learning in MUVEs. The island, now closed, was like a campus, with collaborative shared areas at the centre, including a library and resource centre. Towards the periphery, alternative teaching and learning spaces have interactive whiteboards, chat tools, audio and video streaming, blog page links and other tools. Students' avatars could

'wear' laptops to send emails, write entries in their blogs, watch videos or listen to audio or radio. Cetlment Island's successor is *Open Life*, within which a tutorial group met in 2008 for the course *T175 Networked Living: Exploring Information and Communication Technologies* (Sweeney, 2008).

Researchers into learning in virtual environments met for a conference at the Open University in Milton Keynes, November 20-21, 2008. Apart from a few about gaming, all of the 40-odd papers and presentations were on learning in SL. Among the topics were induction of learners into SL (Truelove & Hibbert, 2008), socialisation and collaboration (Carr & Oliver, 2008; Macintyre, 2008; Minocha & Tingle, 2008), building a community of learners (Peachey, 2008), research and evaluation methods (Moschini, 2008; Robbins-Bell, 2008), electronic dialogue (Coffin, 2008), teaching and learning methods, including problem solving (Addison & O'Hare, 2008; Brown & Hobbs, 2008; Hollins & Robbins-Bell, 2008; Ryan, 2008; Warburton & Pérez Garcia, 2008), learning languages (Derrington, 2008; Tay & Schroeder, 2008), literacy (Gillen, 2008), creative learning (Doyle, 2008; Grove & Steventon, 2008), inquiry-based learning (Webber, 2008), autistic learners in SL (Bignell, 2008), fostering inclusive educational practices (Ball & Pearce, 2008; Sheehy, 2008), Shakespeare in SL (Childs & Chafer, 2008), risk in teaching and learning in SL (Thackray, 2008), design of learning spaces (Minocha & Kear, 2008; Montebello, 2008; Thompson, 2008), developing library services in SL (Scantlebury, 2008), Simulation Linked Object Oriented Dynamic Learning Environment (SLOODLE) (Livingstone, 2008), navigation in SL (Barker, 2008) and staff induction (Trinder, 2008). In the medical field, Toro-Troconis (2008) reported on a trial by Imperial College, London, of game-based learning activities in SL for virtual patients, and Burden, Woodham and Savin-Baden (2008) on problem-based learning for healthcare distance learners.

In many of these projects, a few enthusiastic individuals are leading and carrying out the development activities in 3-D MUVEs, with or without encouragement and support from their institutions. Kirriemuir (2008) reported that research on using SL was being funded by sources both inside and outside the universities and colleges. The projects range from those funded entirely by an individual to major ones funded by the department, institution or a national body. In some cases, funding is only short term, for a year, possibly indicating doubt about whether the project would deliver useful outcomes.

There is no doubt at all, however, about the time required of staff who want to develop and maintain teaching and learning in 3-D MUVEs. As Kirriemuir (2008) found, UK academics committed very substantial amounts, often including their research time *and* leisure time, to say nothing of the commitment of technical and support staff.

3-D MUVEs in US higher education
In the USA, interest in 3-D MUVEs in higher education is growing too. The papers at the March 2008 Society for Information Technology and Teacher Education International

Conference, held in Las Vegas, included seven in this field. Margerum-Leys (2008), at Eastern Michigan University, suggested that social capital could be developed through teacher education in SL. He observed that both houses of worship and university campuses are in SL in fairly large numbers. The former attracts thousands of visitors a week, for example, to the well-developed Mormon island, with many meeting and worship spaces, regular meetings and socials. He studied four religious sites in SL: the First Unitarian Universalist Church of SL, Koinonia Congregational Church, Mosque Aisha bint Abi Bakr Doli and Temple Beit Israel. He compared their design of the space, how they handled synchronous events and how they identified leaders. He concluded that university teacher education could well emulate the houses of worship in SL, by creating similar spaces for study and discussion.

Gao, Noh and Koehler (2008), in a study at Michigan State University, compared students' role-playing interactions via text chat in SL with those in face-to-face role playing. Working with 36 undergraduates taking an educational psychology course, they found that students communicated about the same amount, but differently, in the two groups. In SL, role-playing students took more but briefer conversational turns than when face to face. Both student groups, divided into mini-groups, generated an equal number of topic-related concepts, but they found role playing in SL more interesting and less formal. The researchers concluded that the educational potential of SL had barely been tapped: SL seemed as well suited as face to face for discussing concepts central to the course. The students' role-playing conversations proved just as rich conceptually as those face to face.

Edwards, Dominguez and Rico (2008), visiting from the University of Extremadura in Spain, considered virtual role play in SL as a way of motivating students in higher education. They saw the creation, deployment and development of one's own avatar as motivational for students: they quoted the SL slogan, 'Your world, your imagination'. Creating an avatar was fun, and so was role playing. In SL, they said, there are few of the constraints that exist in classrooms. Their paper identified examples of SL learning spaces likely to be of interest to students, particularly those studying languages.

Jeffery and Collins (2008) looked at immersive experiences and role playing in SL. They pointed out that there are many places in SL for 'cultural immersion' in which conversational and creative language skills can be acquired. Among examples they quoted were the Swedish Institute's immersive experience in SL of *The Siege of Budapest*, the University of California at Davis's *Virtual Hallucination*, designed to provide students with a virtual experience of the effects of schizophrenic aural and visual hallucinations, and *Thursday's Fiction*, a surreal dance fantasy experience of film in SL. They provided a checklist for teachers thinking of using role playing within SL, and concluded by stressing the opportunities offered by an environment that enables teachers to deploy social constructivist pedagogy, belong to a community of practice and make increasing use of social networking.

Collins, Jeffery and Berge (2008) mentored academics moving into SL. They aimed to help the academics to think about teaching in SL and the skills they would need. Their

paper raised 35 questions, many reflecting a 'top-down' approach to teaching that is strangely at odds with social constructivist pedagogy and, for that matter, with the essential nature of SL as an environment in which users to a large extent make the running and the rules as they go along.

McKay, Van Schie and Headley (2008), at George Fox University, envisioned embarking on an educational journey in SL. From their own experience of teaching in SL, they claimed that SL provides a unique environment in which to build student–student and teacher–student relationships, as well as communities. In one class, undergraduates visited in SL a virtual refugee camp in Darfur and four religious sites. They discussed what they found. In another study, the researcher interviewed 50 avatars about the 'learning power' of SL. They told him that their attention was usually held but there were distractions; that concepts could be discussed in depth but play was also important; and that their perceptions of SL's efficiency were influenced by the steep learning curve in mastering the software. He concluded that it would be more valuable to explore SL for playful, explorative learning than to set up a real-life school atmosphere. A third study, to be carried out in the summer term of 2008, was to examine social, cognitive and teaching presence in SL.

Park *et al* (2008), visiting from the Korean National University of Education and the University of Texas at Austin, had in mind a joint research project between their universities with aims of exploring gender roles, increasing users' spatial ability and demonstrating a model for orienting students to learn in SL. Gender roles differ in the two countries, but through engaging together in SL activities, students' mutual understanding might be increased. Similarly, students' spatial abilities might be enhanced through spatial experience within SL. But these were only proposals for discussion. By contrast, Sanchez, one of Park's coauthors, had worked with 18 first-year students at the University of Texas at Austin to develop a model of the students' experiences in SL, and to use records of that experience to demonstrate the effectiveness of orientation to SL via immersive learning (see below).

The 2008 annual conference, in the USA, of the International Society for the Scholarship of Teaching and Learning included only two papers on SL, one dealing with identity issues and the other looking into science education within SL.

Other than these US conference papers, a few journal articles on SL have appeared. Jarmon and Sanchez (2008) described a model case, the Educators' Co-op Residential Community, developed at the University of Texas at Austin. This island had, at that time, 42 SL residents drawn from several disciplines. The study, which is long term, is aimed at developing a community of practice, and attempts to describe the residents' experience as well as looking into the relationship, if any, between information architecture and interactions in the community. The researchers are also looking at whether SL collaborations lead to real-life collaborations. In other words, their interest is in knowledge management and cooperation in SL. Their early findings are based on online

questionnaires, an open-ended survey, unstructured interviews and focus groups using text chat in SL. So far, a community of practice has indeed developed, with instances of collaboration.

Berger (2008) described teaching and learning in SL at Case Western Reserve University with her class of 15 first-year students. She listed Harvard, Ball State University, Pepperdine and New York University as also having islands in SL in 2007. Her students divided into two groups, and met in SL five times during the semester. Among other topics they discussed how virtual selves could acquire authenticity. She and her students found SL was not aggravation-free. There were complaints about, for example, having to converse via text, which they thought frustrating. But she found SL useful as a vehicle for helping her students to think critically about online interaction and communication, and about cultural and social implications of virtual worlds.

Collins (2008), manager of the University of Cincinnati SL project, suggested that academic enquiry into virtual worlds is of a very serious nature indeed. She did not point to the changing needs of learners but rather to the changes in how we can access, interact with and create information—and in how we access, interact with and connect with each other. Virtual workplaces already exist: IBM and Intel have them in SL for geographically dispersed teams. Siemens, working with the University of Cincinnati, is exploring how to obtain customer feedback on new designs by placing them in virtual worlds where visitors can even get inside a design and interact with it. In principle, universities could use virtual worlds to provide student services on a virtual campus and to revolutionise aspects of learning limited at present by physical constraints. But, said Collins, they are faced with a difficult choice: which system do they choose for long-term investment?

Mazar and Nolan (2008) discussed how communication can be negotiated in SL, where teacher–student relationships are changed. They experimented in virtual reality with a 'talking stick', a kind of virtual baton that is passed round giving the holder the floor for the time being, and with 'chatterbots' that answer visitors' questions using programmed text responses. McKinney, Horspool, Willers, Safie and Richlin (2008) suggested how learning-disabled students in higher education may benefit from SL, or be placed at a disadvantage by it.

Berge (2008) was critical of 3-D MUVEs in education and training, particularly SL. In SL, he said, you cannot address the core curriculum. He complained that too much time was needed to get oriented in SL—at least a dozen hours in-world for a 'newbie' to feel comfortable. He thought it would be too much to ask of academics and students. SL could provide for simulations, admittedly, but those have been available elsewhere for many years. Berge was possibly missing the point when he saw one of SL's weakest aspects, as that after orientation, it was hard to know what to do next. His disillusioned comment was: '… even when I found some educational locations, they were essentially empty of content and people. I went to many and found myself isolated, frustrated, and disappointed—another couple of hours down the drain' (Berge, 2008, p. 30). Berge

concluded that teachers and students in SL cannot accomplish anything that they could not accomplish in regular websites. He qualified that blunt view by saying that it was too early to dismiss teaching and learning in virtual worlds. His disillusioned experience of SL is surprising to us: Palitha Edirisingha and his colleagues report much more positively in their paper in this issue on socialisation (see pp. ••). Perhaps Berge also underestimated the need for design of learning in SL and for scaffolding of academics and students as they become residents of their new learning environment.

The main challenges in using 3-D MUVEs for higher education

Noticeably, none of the UK or US papers above reported a major research project. Many were promotional or even speculative, writing about what might happen in SL rather than what has happened. Research into 3-D MUVEs for higher education has only just started, yet the main challenges are already known. Well to the fore is identity. For both academics and their students, establishing identity is a key stage in developing trust between them. In virtual worlds, the usual means in the real world of doing so are scarcely available. Our identities are grounded in our personal histories, an issue that has surfaced from the very first use of e-learning for groups (Jaques & Salmon, 2007), but manifests itself differently and with more complexity where avatars are involved.

A second equally important issue, collaboration, depends to a large extent on trust. As Nicholas Omale and his colleagues at Northern Illinois University found through their case study (pp. 480–495 below), promoting social presence in a 3-D MUVE was easier than promoting cognitive presence despite animated avatars, 3-D space and bubble dialogue boxes in *ActiveWorlds* (not SL). The technology can be distracting rather than enabling. In another paper (pp. 458–479 below), Palitha Edirisingha and his colleagues, at the University of Leicester, look into how a 3-D MUVE like SL can facilitate social presence and foster socialisation among distance learners: they see socialisation among such learners as a crucial step towards success in mastering the course content and laying the groundwork for collaborative learning. David Bell goes even further in his paper (pp. 515–525 below), and calls for research into the emerging cultures of use in 3-D MUVEs, particularly SL. He explores four issues in SL which he thinks have profound implications for the transplanting of learning into SL. These are the emerging 'virtual vernacular' of SL builds (in-world constructions of various kinds), the development of a capitalist economy within and beyond SL, the in-world cultural phenomenon of 'griefing' and the need to take account of the everydayness of SL.

In contrast, Martin Oliver and Diane Carr, in their paper (pp. 444–457 below), approach the question of what and how people learn in virtual environments by exploring the experience of couples that play *World of Warcraft*, a virtual 3-D game, not SL. Peter Twining's paper (pp. 496–514 below), in describing and reflecting on the development of the Schome Park Programme in SL, challenges us to think about the radically different 'lived experiences' that people have of educational systems and how worlds like SL may be the ideal vehicle for exploring alternative models. Avatars, he says, can support reflection on practice by making tacit knowledge explicit.

For many students and academics wanting to start using 3-D MUVEs, there remain problems of access, as papers in this issue demonstrate. Ideally, those who want to learn in 3-D MUVEs must have access to an up-to-date computer linked by broadband to the Internet, with no firewalls that keep out client-based 3-D MUVEs like SL. In some universities, their needs may be met, but in other educational institutions, such access is likely to be restricted. On a broader front, SL avatars cannot move to other virtual worlds or vice versa. Other virtual worlds have different tools and affordances. Currently, the content or avatar of one cannot be transferred to another.

Training in using the medium is essential. It only takes a few minutes to sign on and create an avatar. Learning to move, navigate, view and communicate in a 3-D MUVE takes longer. 'Newbies' (novices) among the avatars are easily recognised by their jerky movements and bad landings, their tendency to bump into virtual walls and other avatars, and their hesitant speech text. Once students and tutors have mastered these skills, their avatars can lead interesting and instructive lives, and social ones. Scripting (programming) skills must be acquired to create islands, landscapes (terraforms, in the jargon), buildings and objects, like those described in Matthew Wheeler's paper (pp. 427–443 below) on the Media Zoo in SL, and in the paper by Nicholas Omale and his colleagues (pp 480–495 below) in *ActiveWorlds*. However, avatars do not need scripting skills to be able to interact with each other and the SL environment. Sheila Webber (in Kirriemuir, 2008, p. 18), at the University of Sheffield, asserts that students who do not learn how to build in SL should not be treated as second-class citizens, and points out that they can do much in SL because others have already created a great deal.

Academics face an additional challenge if they want their students to follow a syllabus or curriculum within a 3-D MUVE: they need to devise SL-tivities (as in the MOdelling of *Second life* Environments project, see Edirisingha *et al*, pp. 458–479 below), that is, group learning activities that take advantage of the virtual environment and that are mediated by structures and content.

Kirriemuir (2008) tried to obtain statistics on how many students actually used SL. His survey yielded very little hard fact. There is anecdotal, survey and focus group evidence in this issue, however, that students like learning in 3-D MUVEs. There is limited evidence, so far, that students acquire knowledge and skills in academic disciplines by using 3-D MUVEs, but they certainly cooperate through engaging in building objects in virtual worlds and they gain experience of discussion and debate in virtual spaces provided for the purpose. For example, the Creating Academic Learning Futures project, a partnership between Leicester and Falmouth (http://www.le.ac.uk/calf), is exploiting the freedom and creativity of the environment to run in-world events to enable students to imagine the future.

Contributions to the Colloquium for this special issue
We invited authors from seven 3-D MUVE development projects that we knew about to write descriptive or analytical contributions for the Colloquium. Nicole Cargill-Kipar's

paper analyses using SL to teach computer science students programming and scripting in multimedia design at Heriot-Watt University; Jeremy Kemp, at San Jose State University in California, and Daniel Livingstone and Peter Bloomfield at the University of the West of Scotland, write about SLOODLE's capabilities for university-level teaching and learning; Dave Cormier, a Canadian consultant, describes OpenHabitat, an inter-university European project, being deployed in two undergraduate courses; Simon Held and Thomas Kretschmer, from the University of Erlangen, Germany, tell us about life-long learning in 3-D at the tertiary level; Margarita Pérez Garcia writes on MUVEnation, another international project, for teacher training in SL; Steph Broadribb and Chris Carter write about using SL in human resource development at the Open University; and Jerry Foss describes critically Learning in Virtual Environments, a project that created Millenium Point in SL for Birmingham City University.

The refereed papers and the papers in the Colloquium include figures and images (such as web pages) that were originally in colour. *BJET* is restricted to black and white for printing, but we refer readers to the online version for full colour graphics.

Finally, with help and advice from Eric Deeson, the *BJET* Reviews Editor, we include reviews of books likely to be useful to readers wishing to investigate 3-D MUVEs for themselves. They deal mainly, but not solely, with the SL world.

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References

Addison, A. & O'Hare, L. (2008). *How can massive multi-user virtual environments and virtual role-play enhance and embed with traditional teaching practice?* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Ball, S. & Pearce, R. (2008). *Learning scenarios and workspaces with virtual worlds: inclusion benefits and barriers of 'once-removed' participation.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Barker, T. (2008). *Factors that hinder and assist learning in virtual environments: an empirical study.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Bayne, S. (2008). Uncanny spaces for higher education: teaching and learning in virtual worlds. *The Association for Learning Technology Journal*, *16*, 3, 197–205.

Berge, Z. L. (2008). Multi-user virtual environments for education and training? A Critical Review of Second Life. *Educational Technology*, *48*, 3, 27–31.

Berger, M. W. (2008). Manon of Second Life: teaching in the virtual world. *Technology and Culture*, *49*, 2, 430–441.

Bignell, S. (2008). *Social communication skills of people diagnosed with autism and Asperger's in 3-D multi-user virtual worlds.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Brown, E. & Hobbs, M. (2008). *Second Life as a holistic learning environment for problem-based learning and transferable skills.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Burden, D., Woodham, L. & Savin-Baden, M. (2008). *Creating a virtual patient player in Second Life.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Carr, D. & Oliver, M. (2008). *Learning, teaching and ambiguity in virtual worlds.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Childs, M. & Chafer, J. (2008). *The impact of the characteristics of a virtual environment on performance: concepts, constraints and complications.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Coffin, C. (2008). *Dialoguing in virtual environments: constraints and opportunities.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Collins, C. (2008). Looking to the future: higher education in the metaverse. *EDUCAUSE Review*, *43*, 5. Retrieved October 19, 2008, from http://connect.educause.edu/Library/EDUCAUSE+Review

Collins, M., Jeffery, A. & Berge, Z. (2008). Mentoring faculty through changing roles as they transition into Second Life. In K. McFerrin, R. Weber, R. Carlsen & D. A. Willis (Eds), *Proceedings of the society for information technology and teacher education international conference 2008*, *19*, 3 (pp. 1362–1365). Chesapeake, VA: AACE.

Derrington, M. (2008). *Get real—this isn't real, this is Second Life: teaching ESL in a virtual world.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November, 20–21.

Doyle, D. (2008). *Immersed in learning: virtual world and creative practice.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Edwards, P., Dominguez, E. & Rico, M. (2008). A second look at Second Life: virtual role-play as a motivational factor in higher education. In K. McFerrin, R. Weber, R. Carlsen & D. A. Willis (Eds), *Proceedings of the society for information technology and teacher education international conference 2008*, *19*, 4 (pp. 2566–2571). Chesapeake, VA: AACE.

Gao, F., Noh, J. M. & Koehler, M. J. (2008). Comparing student interactions in Second Life and face-to-face role-playing activities. In K. McFerrin, R. Weber, R. Carlsen & D. A. Willis (Eds), *Proceedings of the society for information technology and teacher education international conference 2008*, *19*, 4 (pp. 2033–2035). Chesapeake, VA: AACE.

Gillen, J. (2008). *Literacy practices in Schome Park: a virtual literacy ethnography.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Grove, P. W. & Steventon, G. (2008). *Exploring community safety in a virtual community: using Second Life to enhance structured creative learning.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Hollins, P. & Robbins-Bell, S. (2008). *The educational affordances of multi-user virtual environments.* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Jaques, D. & Salmon, G. (2007) *Learning in groups: a handbook for face-to-face and online environments*. London and New York: Routledge.

Jarmon, L. & Sanchez, J. (2008). The Educators' Coop experience in Second Life: a model for collaboration. *Journal of the Research Center for Educational Technology* (Kent State University), *4*, 2. Retrieved October 2, 2008, from http://www.rcetj.org/?type=art&id=89928

Jeffery, A. & Collins, M. (2008). Immersive learning and role plays in Second Life. In K. McFerrin, R. Weber, R. Carlsen & D. A. Willis (Eds), *Proceedings of the society for information technology and teacher education international conference 2008*, *19*, 4 (pp. 2628–2632). Chesapeake, VA: AACE.

Keegan, V. (2008). Virtual worlds take over the online world. *The Guardian*, July 10, 2008. Retrieved November 18, 2008, from http://www.guardian.co.uk/technology/2008/jul/10/internet.games?gusrc=rss&feed=technologyfull

Kirriemuir, J. (2007). The Second Life of UK academics. *Ariadne, October*, *53*. Retrieved January 5, 2009, from http://www.ariadne.ac.uk/issue53/kirriemuir/

Kirriemuir, J. (2008). *A spring 2008 'snapshot' of UK Higher and Further Education developments in Second Life*. Retrieved 13th March 2009, from http://www.scribd.com/doc/7063700/A-Spring-2008-snapshot-of-UK-Higher-and-Further-Education-Developments-in-Second-Life

Livingstone, D. (2008). *Mixed-methods and mixed-worlds: engaging globally distributed user groups for extended evaluation studies*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Macintyre, R. (2008). *In betweenness or in two places at once*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Margerum-Leys, J. (2008). Houses of worship and teacher education in Second Life: the development of social capital. In K. McFerrin, R. Weber, R. Carlsen & D. A. Willis (Eds), *Proceedings of the society for information technology and teacher education international conference 2008*, *19*, 5 (pp. 3055–3060). Chesapeake, VA: AACE.

Mazar, R. & Nolan, J. (2008). Hacking say and reviving ELIZA: lessons from virtual environments. *Innovate*, *5*, 2. Retrieved December 8, 2008, from http://innovateonline.info/index.php?view=article&id=547&action=article

McKay, S., Van Schie, J. & Headley, S. (2008). Embarking on an educational journey in Second Life. In K. McFerrin, R. Weber, R. Carlsen & D. A. Willis (Eds), *Proceedings of the society for information technology and teacher education international conference 2008*, *19*, 3 (pp. 1762–1766). Chesapeake, VA: AACE.

McKinney, S., Horspool, A., Willers, R., Safie, O. & Richlin, L. (2008). Using Second Life with learning-disabled students in higher education. *Innovate*, *5*, 2. Retrieved December 8, 2008, from http://innovateonline.info/index.php?view=article&id=547&action=article

Minocha, S. & Kear, K. (2008). *Design of learning spaces in 3-D virtual environments*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Minocha, S. & Tingle, R. (2008). *Socialisation and collaborative learning of distance learners in 3-D virtual worlds*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Montebello, M. (2008). *SLAVE—Second Life Assistant in a Virtual Environment*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Moschini, E. (2008). *The Second Life Researcher Toolkit: an exploration of in-world tools, methods and approaches for researching and evaluating educational projects in Second Life*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Park, H., Jung, J., Sanchez, J., Cha, J., Kim, J. & Kim, H. (2008). Second Life for education. In K. McFerrin, R. Weber, R. Carlsen & D. A. Willis (Eds), *Proceedings of the society for information technology and teacher education international conference 2008*, *19*, 3 (pp. 1787–1789). Chesapeake, VA: AACE.

Peachey, A. (2008). *First reflections, Second Life, third place: community building in virtual worlds*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Robbins-Bell, S. (2008). *MMPORPG, MUVE … what's the difference? Examining the communication facets of virtual worlds*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Ryan, M. (2008). *16 ways to use Second Life in your classroom: pedagogical applications of Second Life*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Scantlebury, N. (2008). *Developing sustainable library services within the context of a parallel universe?* Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Schroeder, R. (Ed.) (2001). *The social life of avatars: presence and interaction in shared virtual environments*. London: Springer-Verlag.

Seely Brown, J. (2008). How to connect technology and passion in the service of learning. *The Chronicle of Higher Education*, October 17. Retrieved October 29, 2008, from http://chronicle.com/weekly/v55/i08/08a09901.htm

Sheehy, K. (2008). *Virtual environments: issues and opportunities for developing inclusive educational practices*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Sweeney, B. (2008). *Mathematics in a virtual world: how the immersive environment of Second Life can facilitate the learning of mathematics and other subjects*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Tay, W-Y. & Schroeder, R. (2008). *Education and social interaction in virtual worlds: science and language education in Second Life*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Thackray, L. (2008). *Difficult, dangerous, impossible*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Thompson, S. (2008). *The Skinningrove Jetty Project*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Toro-Troconis, M. (2008). *Technical infrastructure and initial findings in the design and delivery of game-based learning for virtual patients in Second Life*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Trinder, K. (2008). *Fearing your avatar? Exploring the scary journey to the third dimension*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Truelove, I. & Hibbert, G. (2008). *Learning to walk before you know your name: pre-Second Life scaffolding for noobs*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Warburton, S. & Pérez Garcia, M. (2008). *Defining a framework for teaching practices inside virtual immersive environments: the tension between control and pedagogical approach*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.

Webber, S. (2008). *Inquiry and information behaviour in Second Life*. Paper presented at ReLIVE08 Conference, The Open University, Milton Keynes, November 20–21.