

# Use and Perceptions of Second Life by Distance Learners: A Comparison with Other Communication Media

*Jo-Anne Murray, Fiona Hale and Marshall Dozier*

VOL. 30, No. 1

## Abstract

Research has shown that the use of communication media in distance education can reduce feelings of distance and isolation from peers and tutors and provide opportunities for collaborative learning (Bates, 2005). The use of virtual worlds (VW) in education has increased in recent years, with Second Life (SL) being the most commonly used VW in higher education (Wang & Burton, 2012). Despite the potential of virtual learning applications, there is limited information available about distance students' use and perceptions of SL in relation to other online communication media. In the study described here, students' use and perceptions of SL were explored with a group of students registered in a part-time distance education Master's program at a large UK university open to international students. A self-completion survey was designed to assess students' use and perceptions of using SL compared with other communication media. The majority of students rated SL lower than other forms of communications media, including email, WebCT discussion boards, Skype, and Wimba, for facilitating communication, promoting the formation of social networks, fostering a sense of community, and enhancing learning. It is possible that the results of this study were influenced by the low use of SL in this program compared to findings in other studies reported on this subject. Further work is required to evaluate the effect of frequency of use and availability of alternative communication media on students' use and perceptions of the virtual world in education.

## Résumé

La recherche a démontré que l'utilisation de médias de communication dans l'enseignement à distance peut réduire le sentiment d'éloignement et d'isolement de leurs pairs et tuteur, et fournir des opportunités pour des activités d'apprentissage collaboratif (Bates, 2005). L'utilisation des mondes virtuels (VW) en éducation a augmenté ces dernières années, avec Second Life (SL) étant le monde virtuel le plus couramment utilisé dans l'enseignement supérieur (Wang & Burton, 2012). Il y a une pénurie d'information disponible sur l'utilisation et les perceptions des étudiants de SL par rapport aux autres médias de communication en ligne disponibles à l'apprenant à distance. C'est pourquoi, dans l'étude décrite ici, ce domaine a été exploré avec un groupe d'étudiants inscrits dans un programme de maîtrise à temps partiel, par enseignement à distance, dans une grande université britannique ouverte aux étudiants internationaux. Un sondage complété par l'étudiant a été conçu pour évaluer l'utilisation et les perceptions des étudiants à utiliser Second Life par rapport à d'autres médias de communication. La majorité des étudiants ont noté Second Life plus bas que d'autres formes de médias de communication tels que le courriel, les forums de discussion WebCT, Skype, et Wimba pour faciliter la communication, promouvoir la formation de

réseaux sociaux, favoriser un sentiment de communauté et être bénéfique à leur apprentissage. Il est possible que les résultats de cette étude aient été influencés par la fréquence plus faible d'utilisation de Second Life dans ce programme par rapport aux autres travaux rapportés à ce sujet. Des travaux complémentaires sont nécessaires pour évaluer l'effet de la fréquence d'utilisation de SL et la disponibilité d'autres médias de communication sur l'utilisation et les perceptions de ce monde virtuel par les étudiants.

## Introduction

Studying at a distance can be an isolating experience, and students can feel insecure about their learning when studying in this way (Knapper, 1988). When used in distance education, communication media can reduce feelings of distance and isolation from peers and instructors, and provide opportunities for collaborative learning activities (Bates, 2005). Such media include asynchronous discussion boards, synchronous chat rooms (e.g., Skype), and virtual classrooms (e.g., Wimba). A more recent development is the use of virtual worlds to build a sense of community in DE courses (Steinkuehler & Williams, 2006). The use of virtual worlds in education has increased in recent years and is regarded as a pedagogical innovation with potential for further growth. The most commonly used virtual world in higher education is Second Life (De Lucia, Francese, Passero, & Tortora, 2009) which was launched by Linden Lab in 2003. While there is increasing evidence to suggest that Second Life (SL) is well received by distance students, little work has been done to evaluate this form of communication in relation to other online communication tools available to the distance learner.

This paper describes a study in which students' use and perceptions of SL were compared with other communication media. Two major research questions guided this study:

- How do students feel about Second Life as a method of communication compared to other communication media?
- How do students feel about Second Life as a way of increasing their sense of community in the program compared to their use of other communication media?

## Literature Review

Communication plays an integral role in learning. It enables sharing of information, and ideas which contribute to learning. Additionally, communication supports learning by clarifying information, promoting enthusiasm in learning, encouraging interaction, and building positive relationships among learners. Within the traditional classroom setting, face-to-face social and communicative interactions occur between the student and the teacher as well as among students (Picciano, 2002). In DE situations, face-to-face interaction cannot take place except via the internet. This lack of face-to-face interaction can impact learners' sense of belonging to a scholarly community (Rovai, 2002). It may also result in students feeling isolated and insecure about their learning (Knapper, 1988) and lead them to discontinue their studies (Peters, 1992). Statistics show that between 20 and 30 percent of students who begin a DE course do not finish it (Rovai, 2002). Other studies suggest that program retention rates are generally lower in DE than in face-to-face environments (Russo & Campbell, 2004). It has been postulated that this lower retention rate is due to the lack of capacity of DE to provide the personal interaction that students require (Carr, 2000). Even students in online courses report feelings of social disconnectedness, missing familiar teacher immediacy and the interpersonal interactions and social cues they

generally have in the face-to-face setting (Slagter van Tron & Bishop, 2009). Therefore, while interaction is important in any educational setting, interaction in DE courses is considered to be the cornerstone of effective DE practices (Abrami, Bernard, Bures, Borokhovski, & Tamim, 2011).

A lack of social interaction has been reported by students to be a severe barrier even in online DE and has been strongly related to learning enjoyment, learning effectiveness, and the likelihood of undertaking further studies by online DE (Warburton, 2009). These findings emphasize the importance of interaction and communication between students engaged in DE programs. Consequently, when considering the design of DE courses, it is critical to incorporate media and mechanisms that facilitate quality and timely interactions.

Online communication media and environments offer opportunities for communication, collaboration, and learning (Dawson, 2006). Although technology does not explicitly improve learning, various communication media can be used in DE to reduce feelings of distance and isolation from peers and tutors and to provide opportunities for collaborative learning activities (Bates, 2005). In early considerations of online education, it was often suggested that pedagogy that is successful offline should be incorporated online (Alexander & Boud, 2001). However, there have been changes in thinking since that time, and now it is not deemed appropriate to simply transfer learning materials from on campus teaching to online teaching. What used to be considered DE was often little more than lectures delivered online in the forms of text, audio, and/or video. The outcome was the transmission of content without interaction with a lecturer to promote discussion-and-answer questions. Alexander and Boud (2001) have pointed out that, in DE, it is vital that learning designers “provide activities to facilitate students’ engaging with and making sense of content” (p. 6).

Through appropriate use of technology, such interaction and collaboration are now attainable in asynchronous and synchronous learning settings. Technology has the capacity to change the concept of distance between learners and their instructors (Beldarrain, 2012). Use of such technology in DE supports constructivist environments in which the aim is to meet the needs of the 21st century learner who wants to stay connected with peers, receive prompt feedback, and work in a group setting rather than in isolation (Beldarrain, 2012). Online learning that includes opportunities for such interaction gives the student a degree of choice in learning by placing the student at the centre of the learning experience. In addition, students studying online at distance need to take responsibility for their learning and use technology to record and reflect on their learning. Online DE provides opportunities for students to seek out information, make connections, and build knowledge. This way, students become active participants in their learning. According to constructivism, learning is a social experience where collaboration is crucial. Given appropriate use of communication technologies, online learning can enable communication between learners without the barriers of time and location (Akyol & Garrison, 2014; Tait, 2014).

The more traditional communication media used in the online DE environment include email and discussion boards. However, a new generation of communication media, often described as Web 2.0 technology, now exists. Web 2.0 is the term used to describe a second generation of the World Wide Web that emphasizes collaboration and sharing of knowledge and content among users. The main Web 2.0 communication tools include social networking sites (such as Facebook and Twitter), blogs, wikis, digital video, video blogs, webcasts, podcasts, social bookmarking, instant messaging, virtual classrooms, and virtual worlds (such as Second Life). The emergence of these new technologies provides opportunities for educators to foster interaction and collaboration among learners and build learning communities (Beldarrain, 2012). Social constructivists support the premise that an individual’s learning takes place because of their interactions in a group. Learning does not occur through assimilation but through the process of

knowledge construction that the learning community supports (Bielaczy & Collins, 1999). Communication-focused media afford opportunities to enhance, enrich, and extend traditional paradigms of distance education by increasing the potential for connectivity, networking, and collaboration as well as enhancing the learning experience. However, in order to do so, these technologies must be used in conjunction with appropriate pedagogical approaches. It is essential that pedagogy drive the use of technology, instead of the other way round (Voogt, Fisser, Roblin, Tondeur, & van Braak, 2012). Moreover, it is important that students understand the reasoning behind the use of technology (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). Chickering and Ehrmann (1996) provided seven guiding principles for implementing and using new technologies. While their work occurred prior to the development of Web 2.0, it continues to be relevant for online DE courses and can be applied to both asynchronous and synchronous communication media:

- Encourage contact between students and faculty
- Develop reciprocity and cooperation among students
- Use active learning techniques
- Give prompt feedback
- Emphasize time on task
- Communicate high expectations
- Respect diverse talents and ways of learning

Based on these seven principles, communication should be timely and purposeful in nature. Because some believe that learning is hindered in environments where physical presence is absent, the use of communication media to promote presence in DE has received much attention in recent years. It is important to consider how these tools affect social presence, since a perceived lack of social presence can be detrimental in DE programs. In the case of a lack of social presence, people may regard the environment to be impersonal and, consequently, may share less; conversely, people who experience an intimate setting characterized by social presence may share more (Leh, 2001). The evaluation of communication media to promote social presence has traditionally been conceptualized as capacity to convey perceptual and affective characteristics including warmth and support for personal and sensitive interactions (Russo & Campbell, 2004). Other scholars have expanded the concept of social presence through communication media to include information richness or media richness (Cheung, Chiu, & Lee, 2011). The construct of media richness is derived from characteristics such as speed of feedback and information transmission capacity. This description has been used to evaluate the various types of communication media used in DE.

Many communication media are based on using text as a means of communicating. One of the challenges with text-based communication, especially if it is used in isolation, is a potential lack of social presence due to a lack of non-verbal cues such as facial expressions and gestures (Leh, 2001). In text-based communication, the reader cannot access the sender's emotions unless the sender expresses them in the text. It has been shown that, when limited nonverbal cues are available in a medium, users pay less attention to the other participants (Reilly, Gallacher-Lepak, & Killion, 2012). Thus, the use of nonverbal cues in online distance education is imperative to build relationships, express thoughts, and develop arguments as intended. Crawford-Ferre and Wiest (2012) have highlighted the lack of visual cues and the importance of good written communication skills in online learning. Moreover, the use of social cues such as smiles and encouraging gestures has been seen to enhance learning (LeFebvre & Alle, 2014). The absence of this kind of cue in DE can lead to a less personal and less friendly experience in learning (Rice & Love, 1987). More recently, studies have shown that a sense of presence can be established in text-based communication through the use of emoticons as a replacement for non-verbal cues (Murphy & Rodrigues-Manzanares, 2012). Many have reported that well-developed interpersonal

relationships can be formed online through text-based communication (Sprecher, 2014). For example, studies have shown that online discussions forums can foster a feeling of presence and support learning communities (Edirisingha, Nie, Pluciennik, & Young, 2009).

Text-based communication can be asynchronous or synchronous. Asynchronous technologies provide opportunities for instructor-student and student-student time-delayed collaboration; the most commonly used asynchronous technologies in DE are discussion boards and email (Russo & Campbell, 2010). Asynchronous discussions using discussion boards can have multiple threads with several discussions and interactions progressing simultaneously. In this scenario, students can respond to the tutor and other students as well as initiate and respond to other threads depending on their interests and points of view. Some students appear to prefer asynchronous communication in DE since, in addition to its anytime-anywhere flexibility, it gives learners time to reflect and respond. Being able to have time to reflect can reduce apprehension in individuals who are likely to withhold their ideas for fear of others not approving (Giesbers, Rienties, Tempelaar, & Gjselaers, 2014). This approach may also be an advantage to those who cannot come to the campus, are physically disabled, are reticent or have trouble articulating ideas, or use English as a second language (Russo & Campbell, 2010). Zheng and Warchauer (2015) found that asynchronous discussions helped non-native English speakers improve their language and literacy development. In summary, text-based asynchronous interactions have been reported to facilitate academic discourse, socialization, and community building through thoughtful and extended engagements at the students' convenience (Oztok, Zingaro, Brett, & Hewitt, 2013).

At the same time, asynchronous communication can pose issues for some learners. Time-delayed responses may result in messages appearing out of context and less meaningful than otherwise, especially if a student has moved on to another topic or task (Russo & Campbell, 2004). They can also lack immediacy, which can limit some students' responses to other students' and instructors' comments (Childress & Braswell, 2006). Synchronous technologies enable students and instructors to interact in real-time despite being located remotely. Examples of synchronous technologies used in the delivery of DE include web conferencing technologies. Web conferencing can support real-time interaction between course participants and virtual classrooms for presentation work and discussion of learning materials. Web conferencing technologies, such as Skype, facilitate real-time text-based exchanges or audio discussions, while virtual classrooms such as Wimba provide live features, such as audio, video, application sharing, and content displaying (De Lucia et al., 2009). An important aspect of these tools is the opportunity for immediacy of interaction, whereby student-student and student-instructor conversations can take place through typing of messages. This activity does depend, to some extent, on an individual's competence with typing. Overall, these technologies can lead to situations of just-in-time clarification and information sharing (Simkins, Maier, & Rhem, 2009). Learners can experience immediate recognition of their efforts and contributions to the course which, in turn, encourages autonomous and active learning. While such technologies facilitate real-time interaction, they do not offer features that simulate the conventional classroom.

Three-dimensional (3D) virtual worlds may provide an additional level of interaction generally unavailable through other collaborative media used in DE. The most commonly used virtual world in higher education is Second Life (De Lucia et al., 2009) which was launched by Linden Lab in 2003. Second Life is a virtual world that covers over 700 million square metres of virtual space where users can create alter egos called avatars and interact with other people and objects in cyber-space. The use of avatars in teaching and learning can provide a level of anonymity that can promote discussion and questions from students who may not be as confident at raising their hands as "themselves." Also, the use of simulations in SL can help students to develop skills in low-risk environments when access to real-life situations is not available or when students have

not yet developed the skills to work in a real environment. At the present time, there is little information available on distance students' use and perceptions of SL in relation to other online communication media. For example, there is little research knowledge of how students engage with tools such as Skype, Facebook, and Twitter in comparison with virtual worlds.

## Methods

This study involved a survey of graduate level student use and perceptions of SL compared with other communication media in a distance course. Ethical approval was sought and received from the ethics committee of the University's School of Veterinary Studies.

### Participants

The study population was a group ( $n = 76$ ) of graduate students registered in a distance education Master's degree in Equine Science at a large UK University open to international students. These students were registered in a part-time program spanning three years. In years one and two, students took instructor-taught courses and then moved to the research element of the program in year 3. A mixed approach to learning and teaching is used in the program, with the provision of recorded lectures, reviews of the scientific literature, problem-based learning, and tutorial sessions, all of which were provided online in order to promote collaboration and discussion of relevant topics. The program itself consisted of six 20-credit taught courses and a 60-credit dissertation course. At this university, a course refers to a unit or module within a degree program. There were 30 students registered in each of years one and two of the program and 16 registered in year three for a total of 76 participants. Students were assisted in setting up SL accounts and given an orientation to SL at the start of the academic year. When students entered SL for the first time, they landed at Orientation Island. Students were provided with instructions to teleport to the Equine Science program area in SL (Figure 1) after they had selected their avatars. Second Life was then used for hosting synchronous tutorial sessions at various points throughout the academic year. All communication in SL, including the tutorial sessions run in SL, used the text-chat tool. The tutorial sessions held in SL were run as supplementary sessions to augment the learning activities of the course, which was developed in WebCT.



**Figure 1: A typical tutorial meeting in Easter Bush Farm in Second Life. Easter Bush Farm is an area in Second Life created to provide students with a virtual space for tutorial sessions and group work.**

### The Survey

An online survey was designed for this study to assess students' use and perceptions of using SL compared with other communication media used by DE students. Students were asked to complete the survey once at the end of the academic year. At the point that the students were asked to complete the survey, they had been supported in how to use SL as well as the other technologies used in the program. This support involved introductory sessions to using all of the tools considered in this study as well as continued support throughout the program. Data were gathered via an online questionnaire using the Bristol Online Survey tool. The survey consisted of 20 Likert-scale questions items, each with a number of fixed alternatives, and three open ended questions that asked participants to outline their first thoughts on using SL, what they liked about SL and what they disliked.

Likert-scale questions were used for this survey as they tend to be easily understood by respondents and are an efficient and inexpensive way of obtaining data, especially in an online format. The responses are quantifiable and easily coded for data analyses. Quantitative research based on the use of Likert scales is not without its limitations including a number of psychometric and conceptual issues (Ogden & Lo, 2011). Therefore, it is important to interpret Likert data in the context of participants' decision making processes; for example, individuals may make judgements relative to those around them.

In addition to questions on student demographics (age, sex, country of residence, language and previous education), the survey contained items that focused on SL as a communication tool. Questions asked about the timing of the use of SL for communication, community building, and learning.

The survey questions were designed to answer two questions:

- How do students feel about Second Life as a method of communication compared to other communication media?
- How do students feel about Second Life as a way of increasing their sense of community on the program compared to using other communication media?

Effort was taken to connect the research questions to the survey questions. Pre-testing of the questionnaire was conducted with faculty who had used SL and DE students who were familiar with using SL but who were not part of the student groups being surveyed. This process was undertaken to ensure that respondents understood the questions as they were intended. The questionnaire was subsequently revised according to the feedback from the pre-testing. Once the questionnaire was finalized, it was emailed to the study participants for completion. Students participated voluntarily while their completion of the survey was regarded to be their consent to participate in the study. No incentives were offered. The survey was designed to take approximately 20 minutes to complete.

## Data Analyses

All quantitative data were analyzed for median, mode, and interquartile range (IQR). Statistical Package for the Social Sciences (SPSS) Version 19.0 was used to perform the data analyses. Pearson (chi-square ( $\chi^2$ )) analyses were conducted to examine the linear relationships between data sets, while Mann-Whitney U tests were used to compare SL with other communication tools used in the program (Robson, 2002). Open text answers were analyzed manually through reading, inductive sorting into themes, and quantifying the number of comments related to each theme. Recurrent themes were collated and used to back up or further explain findings from the quantitative data. This approach enabled the researcher to be close to the data and to have the

opportunity to determine the meaning of the data through a flexible process of analyses (St John & Johnson, 2000).

# Results

## Survey Response Rate and Respondent Demographics

The survey response rate was 60%, with 46 out of a possible 76 students responding to the majority of the questions. There were four male respondents and 42 female respondents. One (2%) respondent was under 25 years of age; 20 (44%) were between 26 and 35 years; 8 (17%) were between 36 and 35 years; 16 (35%) were between 46 and 55 years; and one respondent (2%) was over 55 years of age.

Respondents were from a number of different countries: 23 (50%) were from the United Kingdom, five (11%) from the United States, four (9%) from Canada, four (9%) from other European countries, and four (9%) from other non-European countries. Twelve percent of the respondents did not provide information about their country of residence. The majority of respondents (85%) reported English as their first language. Retention rate for the program was 100%.

Seventeen (37%) respondents had completed their last formal program of study in the previous five years; 13 (28%) had not studied in a formal program in over 10 years; and 11 (24%) had not studied in the last 5 to 10 years. Only 5 (11%) of the respondents had no gap between their current studies and a previous degree. In terms of online learning, 12 respondents (26%) had studied online previously while the remaining 34 (74%) had never studied in an online learning format. The majority of respondents were in year two of the program (21), followed by year one (17), and year three (8).

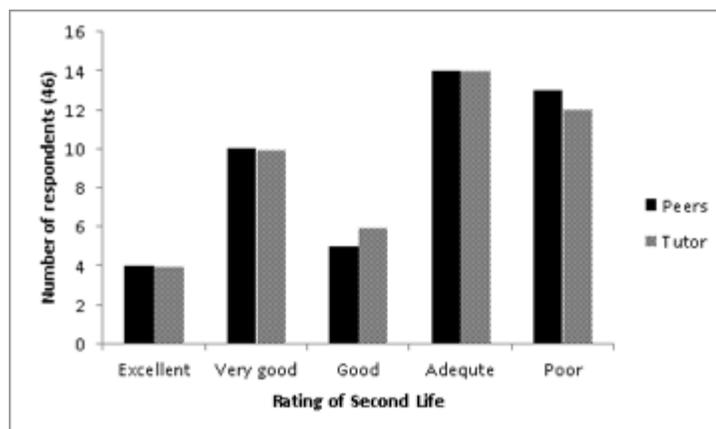
## Use of On-line Communication Media

Prior to undertaking their current studies, none of the respondents had used Second Life as a communication tool. The vast majority of respondents (83 %) had not heard of Second Life prior to commencing their current studies, and none of them had visited this virtual world. Pearson's chi square analysis was used to examine the relationship between the age of respondents and whether they had previously heard of SL. Results indicated that significantly more respondents ( $\chi^2 = 15.82$ ,  $p = 0.003$ ) in the younger age groups (under 35 years) had heard of SL before commencing the program compared to those in the older age groups (over 35 years). A few respondents (15%) had participated in on-line gaming activities, and there was no relationship (determined by Pearson's chi-square) between age and participation in on-line gaming activities.

## Second Life for Communicating

The majority of respondents rated SL as adequate for communicating with peers and tutors (Figure 2). When asked to rate SL in comparison with other communication tools, the majority of respondents rated Skype and WebCT as excellent for communicating with their peers (Table 1). Wimba was rated as very good. Most participants rated SL as either adequate (11) or poor (14). This rating was significantly lower (as determined by Mann-Whitney U tests) than all other communication methods ( $p < 0.01$ ). In terms of communicating with the tutor, the majority of respondents rated WebCT, Wimba, and Skype as either excellent or very good (Table 1); by contrast, most participants rated SL as adequate or poor which, again, was significantly lower ( $p < 0.001$ ) than all other communication methods (data analyzed via Mann-Whitney U tests). Mann-

Whitney U tests showed no significant difference between how respondents rated SL for communicating with peers or communicating with the tutor, although, numerically, SL was rated lower for communicating with peers (5 = poor) than was communicating with the tutor (4 = adequate).



**Figure 2: Respondents' rating of Second Life for communicating with peers and tutor**

Table 1: Respondents' rating of Second Life for communicating with peers and tutors compared with other communication tools (n = 46 unless otherwise stated)

| Communication tool | Rating* |    |    |    |    | Median | Mode | IQR |
|--------------------|---------|----|----|----|----|--------|------|-----|
|                    | 1       | 2  | 3  | 4  | 5  |        |      |     |
| <b>Peers:</b>      |         |    |    |    |    |        |      |     |
| Skype              | 18      | 15 | 8  | 5  | 0  | 2      | 1    | 3   |
| Wimba (n = 45)     | 8       | 14 | 13 | 3  | 7  | 3      | 2    | 4   |
| WebCT              | 20      | 17 | 7  | 2  | 0  | 2      | 1    | 3   |
| Second Life        | 10      | 5  | 6  | 11 | 14 | 4      | 5    | 4   |
| <b>Tutor:</b>      |         |    |    |    |    |        |      |     |

|                |           |           |   |           |    |   |          |   |
|----------------|-----------|-----------|---|-----------|----|---|----------|---|
| Skype          | 15        | <b>16</b> | 7 | 7         | 1  | 2 | 2        | 4 |
| Wimba (n = 45) | <b>13</b> | 12        | 8 | 3         | 6  | 2 | <b>1</b> | 4 |
| WebCT          | <b>17</b> | 16        | 8 | 4         | 1  | 2 | <b>1</b> | 4 |
| Second Life    | 9         | 7         | 3 | <b>14</b> | 13 | 4 | <b>4</b> | 4 |

\*1 = excellent; 2 = very good; 3 = good; 4 = adequate; 5 = poor

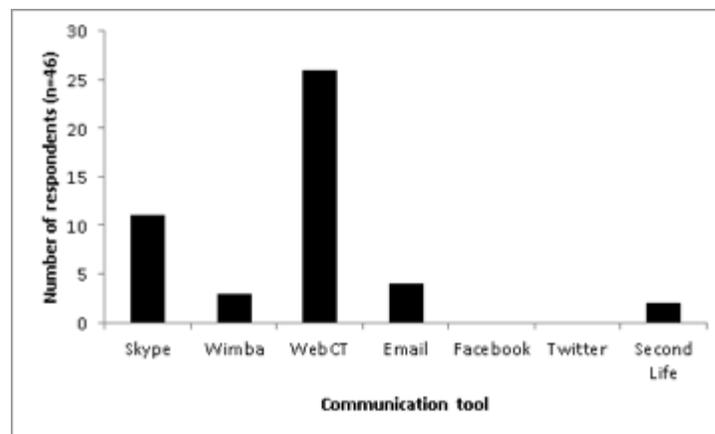
Ranking SL as a communication method, the majority of respondents ranked it as their second least preferred method of communicating. Most respondents preferred Skype, email, and the discussion board in WebCT (Table 2). Mann-Whitney U tests revealed SL to be ranked significantly ( $P < 0.001$ ) lower than Skype, Wimba, WebCT and email, but higher than Twitter ( $P < 0.001$ ) and similar to Facebook. When asked to select their preferred method of communicating in the programme, 26 respondents (57%) reported the WebCT discussion boards as their preferred method of communicating in the program. The second preferred method chosen by 11 participants (24 %) was Skype (Figure 3). Two respondents selected SL as their preferred communication method (Figure 3). Asked about their preference for asynchronous and synchronous communication, 38 (83%) respondents reported that they preferred to use a mix of asynchronous and synchronous communication methods as opposed to using asynchronous or synchronous communication strategies alone.

Table 2: Respondents' ranking of Second Life compared with other communication tools

|                    | Rank*     |           |    |   |   |   |   |        |          |     |
|--------------------|-----------|-----------|----|---|---|---|---|--------|----------|-----|
| Communication tool | 1         | 2         | 3  | 4 | 5 | 6 | 7 | Median | Mode     | IQR |
| Skype (n = 46)     | <b>18</b> | 8         | 11 | 2 | 3 | 4 | 0 | 2      | <b>1</b> | 5   |
| Wimba (n = 45)     | 6         | <b>10</b> | 6  | 8 | 8 | 4 | 3 | 4      | <b>2</b> | 6   |
| Email (n = 45)     | <b>18</b> | 13        | 6  | 5 | 2 | 0 | 1 | 1      | <b>1</b> | 6   |
| WebCT (n = 46)     | <b>34</b> | 7         | 2  | 2 | 0 | 0 | 1 | 2      | <b>1</b> | 6   |

|                      |   |   |   |   |   |   |    |   |   |   |
|----------------------|---|---|---|---|---|---|----|---|---|---|
| Facebook (n = 45)    | 2 | 4 | 8 | 7 | 8 | 9 | 7  | 5 | 6 | 6 |
| Twitter (n = 43)     | 2 | 0 | 0 | 1 | 4 | 6 | 30 | 7 | 7 | 6 |
| Second Life (n = 46) | 3 | 5 | 5 | 4 | 8 | 5 | 16 | 5 | 7 | 6 |

\*1 = most preferred; 7 = least preferred



**Figure 3: Respondents' preferred method of communicating**

### Second Life for Community Building

Twenty-two respondents (48%) reported SL as making them feel part of a community of learners, while 24 did not (52%). When asked to rate SL on a scale of 1 to 5 (with 1 being excellent and 5 being poor) for promoting a sense of community, 13 respondents (29%) reported SL as adequate. Ten respondents (2%) reported SL as very good and 11 (24%) selected poor. The majority (36, 80%) of respondents did not feel that SL improved their capacity to form social networks in the program. Compared with other tools (data analyzed via Mann-Whitney U tests), SL was rated lower than Skype, WebCT, and Wimba ( $p < 0.05$ ) for promoting a sense of community between students (Table 3). SL rated similarly to Facebook and email but higher than Twitter ( $p < 0.01$ ) for promoting community. When asked to rate SL for feeling connected with the university, the majority of respondents (20, 44%) reported SL as poor. Asked about other communication tools, the majority of respondents reported the use of WebCT as either excellent (12) or very good (11) for feeling connected to the university. All other options were reported as either adequate or poor (Table 4).

For communication outside of scheduled tutorial sessions, 12 respondents reported using SL for this purpose; 32 did not use SL outside of the course; and two used it only with encouragement from other students. When asked about which communication tools they used outside formal sessions, WebCT, email, and Skype were used by 98%, 91% and 85% of respondents, respectively. One-third of respondents used Wimba and a small number (15%) used Facebook.

Respondents who felt that SL improved their capacity to form social networks were asked to provide further information about how SL did this. A small number of respondents ( $n = 4$ )

provided further information. In general, their descriptions of how SL improved their capacity to form social networks focused on getting to know each other better because of the immediacy of SL. They also spoke about enhanced personal interaction:

**Comment 1:** Certainly helped with the group work. Found that we not only discussed the work but got to know each other a lot more. The avatars brought in humour which helped break down the barriers.

**Comment 2:** We could arrange to meet to discuss tasks, which led to getting to know one another much better as we are all remote users distance learning therefore gives you the University experience in a virtual world.

**Comment 3:** It gave you an image... just seemed more personal.

**Comment 4:** Yes.....but no more than other media like Skype.

Table 3: Respondents' rating of Second Life for promoting a sense of community among students compared with other communication tools (n = 46 unless otherwise stated)

| Communication tool | Rating* |    |    |    |    | Median | Mode  | IQR |
|--------------------|---------|----|----|----|----|--------|-------|-----|
|                    | 1       | 2  | 3  | 4  | 5  |        |       |     |
| Skype              | 15      | 15 | 12 | 1  | 3  | 2      | 1 & 2 | 4   |
| Wimba (n = 43)     | 5       | 13 | 15 | 4  | 6  | 3      | 3     | 4   |
| Email              | 7       | 9  | 9  | 16 | 5  | 3      | 4     | 4   |
| WebCT              | 18      | 16 | 8  | 2  | 2  | 2      | 1     | 4   |
| Facebook           | 2       | 5  | 14 | 13 | 10 | 4      | 3     | 4   |
| Twitter (n = 38)   | 0       | 2  | 3  | 7  | 26 | 5      | 5     | 3   |
| Second Life        | 4       | 11 | 5  | 15 | 11 | 4      | 4     | 4   |

\*1 = excellent; 2 = very good; 3 = good; 4 = adequate; 5 = poor

Table 4: Respondents' rating of Second Life for feeling connected with the University compared with other communication tools used for tutorial sessions (n = 46 unless otherwise stated)

| Communication tool | Rating* |    |    |    |    | Median | Mode  | IQR |
|--------------------|---------|----|----|----|----|--------|-------|-----|
|                    | 1       | 2  | 3  | 4  | 5  |        |       |     |
| Skype              | 6       | 7  | 9  | 12 | 12 | 4      | 4 & 5 | 4   |
| Wimba (n = 43)     | 6       | 3  | 12 | 10 | 13 | 4      | 5     | 4   |
| WebCT              | 12      | 11 | 8  | 8  | 7  | 2.5    | 1     | 4   |
| Second Life        | 6       | 7  | 5  | 9  | 19 | 4      | 5     | 4   |

\*1 = excellent; 2 = very good; 3 = good; 4 = adequate; 5 = poor

### Second Life for Learning

Twenty-three (51%) respondents reported the tutorial sessions in SL to be beneficial to their learning while 22 (49%) did not. When asked to rate SL as an educational tool, the majority (26%) chose somewhat valuable. When asked to rate the tutor-led tutorial sessions carried out in SL, the majority rated them as either extremely (14) or reasonably (14) beneficial. Pearson's chi-square analysis revealed a significant relationship between how respondents rated SL for communicating with peers ( $\chi^2 = 22.50$ ,  $p < 0.001$ ) and tutors ( $\chi^2 = 19.81$ ,  $p = 0.001$ ) and how beneficial they felt the tutorial sessions were. Those who rated SL as excellent, very good, or good for communicating reported that the tutorials in SL were either extremely or reasonably beneficial to their learning; conversely, those who found that SL was poor for communicating reported that it was non-beneficial to their learning. Spearman's rank correlation tests showed no correlation between the timing of orientation to SL and whether the participants found it to be beneficial to learning. When comparing content-specific tutorials conducted with various technologies (Table 5), the majority of respondents reported Skype (34), Wimba (29) and WebCT (34) to be either excellent or very good. Based on Mann-Whitney U tests, SL was rated significantly ( $P < 0.01$ ) lower than all other communication tools; most respondents reported SL as either adequate or poor (27). A similar pattern was observed for increasing students' engagement with their learning, with SL rating significantly ( $P < 0.001$ ) lower than all other methods of communicating when data were compared using Mann-Whitney U tests (Table 6).

Table 5: Respondents' rating of tutorial sessions conducted through different communication tools for the purpose of increasing understanding of the subject area (n = 46 unless otherwise stated)

|                    | Rating* |    |   |    |    |        |       |     |
|--------------------|---------|----|---|----|----|--------|-------|-----|
| Communication tool | 1       | 2  | 3 | 4  | 5  | Median | Mode  | IQR |
| Skype              | 19      | 15 | 9 | 3  | 0  | 2      | 1     | 3   |
| Wimba (n = 44)     | 17      | 12 | 6 | 4  | 5  | 2      | 1     | 4   |
| WebCT              | 17      | 17 | 7 | 5  | 0  | 2      | 1 & 2 | 3   |
| Second Life        | 3       | 11 | 5 | 17 | 10 | 4      | 4     | 4   |

\*1 = excellent; 2 = very good; 3 = good; 4 = adequate; 5 = poor

Table 6: Respondents' rating of tutorial sessions conducted through different communication tools for the purpose of increasing engagement with learning (n = 46 unless otherwise stated)

|                    | Rating* |    |   |    |    |        |       |     |
|--------------------|---------|----|---|----|----|--------|-------|-----|
| Communication tool | 1       | 2  | 3 | 4  | 5  | Median | Mode  | IQR |
| Skype              | 18      | 18 | 5 | 5  | 0  | 2      | 1 & 2 | 3   |
| Wimba (n = 45)     | 17      | 11 | 8 | 4  | 5  | 2      | 1     | 4   |
| WebCT              | 19      | 17 | 7 | 2  | 1  | 2      | 1     | 4   |
| Second Life        | 9       | 6  | 5 | 14 | 12 | 4      | 4     | 4   |

\*1 = excellent; 2 = very good; 3 = good; 4 = adequate; 5 = poor

Respondents who felt SL benefited their learning were asked to provide further information. A small number of respondents (n = 6) provided additional information. Respondents' descriptions of how they felt SL benefited their learning reflected ideas about "real-time," immediacy, and personal interaction:

**Comment 1:** It allowed for a more efficient communication between students and instructor. One of the biggest drawbacks that I've found in this programme is that it is very easy for a student to feel alone and alienated in this programme. Second Life is another method by which to increase the participation of the students.

**Comment 2:** We got to know one another more personally, it was so interactive.

**Comment 3:** It was good to discuss areas of learning at the same time, like in a classroom environment. You also learn from other people's questions and answers. You could type a question or thought at the same time as someone else speaking, so the communication is freer, although it does mean you get more than one conversation happening at the same time. It's also good to be able to access all the conversation in text, within or post session, so that you don't miss anything.

### General Perceptions of Second Life

Respondents were asked to provide feedback on what they liked about Second Life. A high proportion (78%) of respondents provided free text comments in response to this question. Four themes emerged from these responses; the main two themes were that it was fun and a bit different (n = 12) and that it promoted a sense of community and reduced feelings of isolation (n = 11). A number of students (n = 6) liked the real-time, interactive way of communicating. A few students (n = 5) reported that they liked nothing about SL (Table 7).

Table 7: Prevalence of themes based on what respondents liked about using Second Life (n = 36)

| Theme  | Prevalence | Evidence  |
|--|------------|---|
| Nothing                                      | 5          | "Nothing particular."   |
| Fun and a bit different                      | 12         | "It was kind of fun, like a game."  |
| Real-time, interactive way of communicating  | 6          | "Possibility of direct communication with the group of people from different parts of the world." |
| Sense of community and feeling less isolated | 11         | "I thought the concept was excellent and there was a sense of community there."                   |

Respondents were asked to give feedback on what they disliked about Second Life. A high proportion (78%) provided free text comments for this question. Five themes emerged (Table 9)

from these responses, the main two being that it was just a game and distracted from learning (n = 13) and that it was difficult to navigate and was time consuming (n = 11). Six students disliked SL due to the technical issues they encountered with their computer specification and/or internet connection. A few students (n = 4) reported that they disliked not knowing who people were and that they could be approached by anyone.

Table 8: Prevalence of themes and thoughts about what respondents disliked about using Second Life (n = 36)

| Theme   | Prevalence | Evidence  |
|---|------------|---|
| Nothing   | 2          | "Nothing particular."   |
| Just a game and distracted from learning                                  | 13         | "Just a toy/game. It made me feel a bit distracted from the topic of discussion."   |
| Difficult to navigate and time consuming                                  | 11         | "Learning to steer and operate the avatar took some investment in time and could be distracting."   |
| Not knowing who people are and being approached by anyone                 | 4          | "Not knowing who anyone is, the different names make it confusing, not always sure who you are talking to. Anyone will 'message' you...even if you do not want them to!"<br><br>"Outside your own learning areas there were lots of weirdos." |
| Technical issues due to computer specification and/or internet connection | 6          | "I found that Second Life could be a little slow, but this was probably more to do with my internet connection."  |

## Discussion

### Second Life for Communicating

The majority of students rated SL as adequate or poor for communicating with their peers and their tutor. Conversely, Skype, Wimba, and WebCT discussion boards were rated by most students as either excellent or very good. While there is a lack of literature comparing SL with other methods of communicating and learning in distance-based contexts, in a study by Lowe (2008),

students reported SL to be a better way to learn than asynchronous on-line interaction (e.g., discussion forums); they also reported SL to be better than other forms of synchronous communication in courses although details of the other forms of synchronous courses were not provided. The conflict in findings between this present study and Lowe's (2008) may be explained by the nature of the tasks undertaken in SL; in Lowe's (2008) study, students undertook all of their learning in SL as opposed to the current study where SL was used to hold synchronous tutorials as part of a course run in WebCT. Respondents in the current study reported WebCT discussion boards to be their preferred method of communicating in the program. At the same time, a large proportion (83%) of students preferred a mix of asynchronous and synchronous communication rather than one or the other. The preferred form of synchronous communication was Skype; SL was the least preferred. It is likely that the nature of use of SL in the current study affected the findings. Importantly, SL was only used for text-based synchronous tutorial sessions. The use of audio for tutorial sessions in SL is problematic, since there are no visual cues prior to someone talking which can result in many people speaking at once. Skype offers real-time synchronous communication, without similar technical issues and with a shorter learning curve than SL. Some of the free text comments offered by the students pointed out the shortcomings of SL. One student stated the following: "If we could have virtual lectures, with slides etc., then it would be great. Otherwise it's not much different from Skype in terms of communication."

While some students reported the real-time interactivity of SL as something they liked, a few did not like this same anonymity. Edirisingha et al. (2009) have reported that students enjoy discussions in SL since they can see their own and others' avatars. Not knowing who the students were talking to, coupled with the fact that anyone could message them, was an issue for some students in this study. A few students reported that there were "lots of weirdos" in SL, especially when they first entered Orientation Island. According to Warburton (2009), trust and authenticity are critical factors linked to the barriers associated with using SL. By comparison, Skype offers students the chance to know who they are communicating with and who is currently on-line; one student stated the following:

Skype allows you to see who's in when you turn on your computer. Second Life doesn't have that ability. It made "chatting" in Second Life more difficult that you'd have to set an appointment with someone. My best friends in the program were on Skype and I could drop in for a five minute chat with them because I knew they were there.

It would appear that the timing of orientation to SL affected users' rating of this virtual world. Those introduced to SL immediately before using it as a learning environment rated it more highly than did those whose orientation sessions were not closely linked to the tutorial sessions. This result may be related to just-in-time training in that those who experienced the orientation session close to using SL felt more prepared to use it and were more comfortable than other students. The overall lower rating of SL in relation to many of the communication media may be attributable to the amount of time spent in SL compared to time spent using these other technologies. Since time on task is an important factor in learning (Clark, 2011), it is possible that the students in this current study did not spend enough time in SL to become familiar with it or as comfortable with using it compared to some of the other communication tools that they used more frequently.

### **Second Life for Community Building**

There was no consensus about SL promoting a sense of community in the program, with equal numbers of students feeling that it did and did not. Compared to other tools, SL was rated lower than Skype, WebCT and Wimba but similar to Facebook and email in promoting a sense of community. McKerlich et al. (2011) found that the majority of participants in courses held

exclusively in virtual worlds experienced a sense of community. Similarly, De Lucia (2009) reported that students using SL felt a sense of belonging to a learning community. It is likely that the students in this current study did not visit SL enough to be comfortable using it and to build a sense of community. Additionally, the issues with identity and feelings of anonymity reported by some students may have hindered their ability to experience a sense of community in SL. In other media, they knew who everyone was. This idea was presented in some of the free text comments, "Not knowing who anyone is... the different names make it confusing, not always sure who you are talking to." Such sentiments align with Warburton's (2009) description of identity issues in relation to the use of SL. The anonymity in SL in this current study may have fostered feelings of distrust which may have hindered or prevented the development of a sense of community for some students. While the forms of identity used in SL may be advantageous for some, for others, it may be inhibitory and lead to a decreased sense of community.

The majority of students in the current study did not feel that SL facilitated the formation of social networks. This finding concurs with the work of McKerlich et al. (2011) who found that, when assessing cognitive, teaching, and social presence in SL, social presence was rated lowest. This idea is unusual given that SL was designed as a social networking platform to encourage social interaction. It also conflicts with other research. For example, Baker et al. (2009) reported that, by using SL in an informal setting, students felt more comfortable interacting with their instructors and other students, making them more comfortable with the technology and leading to a stronger sense of engagement with its use in subsequent studies. Social presence appears to vary according to the purpose of the interaction (Akyol & Garrison, 2014). McKerlich et al. (2011) did not observe a strong social presence among students using SL which they attributed to the students' perception that any engagement in online activities should be as solely educational. However, it is well documented that social presence is strongly related to learning (Richardson & Swan, 2003) and important to creating conditions for sharing and challenging ideas through critical discourse (Garrison & Cleveland-Innes, 2005). Social presence is also imperative for the development of a learning community and cultivating an environment of trust where participants feel free to collaborate. It is possible that the students in this current study did not experience this environment of trust due to the previously noted identity concerns. This idea is described by Warburton (2009) as the in-world profile of each avatar and how specific profiles limit the social discovery of others. This identity exists only within the virtual world and is not carried into the real-world environment. Conversely, other communication media such as Facebook and Skype may be perceived to better facilitate the social discovery of others. It is possible that developments in the scaffolding of avatars may facilitate the extension of in-world activities into the real world environment. Such advances could counter perceptions, such as those reported here, of SL not facilitating the formation of social networks.

The majority of students (70%) did not use SL for communicating outside of the scheduled tutorial sessions which differs from the findings of De Lucia et al. (2009) who found that many of the students in their study expressed high interest in using SL to meet classmates. The difference between the current study and the De Lucia et al. (2009) study is how SL was used. In De Lucia et al.'s study, students experienced the majority of their learning, including virtual lectures and collaborative group work, within SL. Specific recreational spaces were created to favor informal communication and socialization. It has been reported that creating a virtual space where students can congregate appears essential to a sense of community among students (Tait, 2014). Although Easter Bush Farm in the current study provided this opportunity for students, it is possible that these students did not visit SL enough to feel comfortable using this place for communication outside of the scheduled activities. One student remarked, "I'd say it's simply a matter of being more comfortable using other means of communication." Further work to evaluate frequency of use and perceptions of SL would be valuable. Clark (2011) endeavoured to evaluate visitor data in

Genome Island, an interactive laboratory environment in SL, for evidence of student engagement with learning; however, no clear picture emerged due to issues with distinguishing students from other visitors to the area. In this study, Easter Bush Farm housed various interactive elements: videos, quizzes and data on animals/management. Data on students' engagement with these learning objects were not captured in this study.

## **Second Life for Learning**

There was no consensus about whether SL facilitated student learning with almost equal numbers of students feeling that it did and did not. Overall, students rated SL as somewhat valuable as an educational tool. Lowe (2008) found that the majority of students found SL to be beneficial to their understanding of science when used exclusively to teach a science course. Conversely, in the current study, the majority of students rated SL as either adequate or poor in terms of increasing their understanding of the subject and engagement for the purpose of learning. This result may be attributable to SL being regarded by some to be an invalid educational space; one of the ideas presented in the free text comments was that SL was simply a game which distracted from learning. This idea may be related to the students not using SL enough and/or only using it as a supplementary way of communicating. The majority of students rated Skype, Wimba, and WebCT discussion boards as either excellent or very good for promoting understanding of the subject and engagement. It would appear that students' rating of SL for learning is related to how they felt about SL as a communication medium. It would also appear that the learning activities built in SL are likely to affect students' perceptions of whether or not SL benefits learning. In the current study, students used SL for text-based tutorial sessions which were conducted with other communication media as well. SL did not rate as highly as the other media. This finding may be due to identity issues, technical issues, time involved in learning to use SL, and the barriers described by Warburton (2009). SL may be better used as a complete virtual learning environment where all learning materials and activities are housed, than as a complementary communication and learning tool. Some students in the current study described SL as another technology they had to learn to use. This sentiment may tie into the perception that SL did not benefit learning. It also corresponds with the comments made by some students about SL distracting them from their learning. The perception that SL does not increase the capacity of students to form social networks is likely connected with their perceptions about SL and learning. Cobb (2011) reported that students' perceptions of online social presence contributed significantly to their perceptions about overall learning.

## **Conclusion**

This study explored students' use and perceptions of SL compared with other communication media in a part-time distance Master's program at a large UK University. Results revealed that the majority of students rated SL lower than other communications media including email, WebCT discussion boards, and Wimba for facilitating communication, promoting the formation of social networks, fostering a sense of community, and supporting learning. It is possible that the students in this study did not visit SL enough to become familiar and comfortable with the environment. Additional work is required to further explore these findings. It could also be beneficial to look at the use of SL by a younger group of learners with greater comfort with gaming and virtual reality. Finally, it would be worthwhile to evaluate the investment involved in using SL in terms of training costs, just in time supports, and the creation of course-specific objects and settings.

# References

1. Abrami, P. C., Bernard, R. M., Bures, E. M., Borokhovski, E., & Tamim, R. M. (2011). Interaction in distance education and online learning: using evidence and theory to improve practice. *Journal of Computing in Higher Education*, *23*, 82–103.
2. Akyol, Z., & Garrison, D. R. (2014). The development of a community of inquiry over time in an online course: Understanding the progression and integration of social, cognitive and teaching presence. *Journal of Asynchronous Learning Networks*, *12*(3–4), 3–22.
3. Alexander, S., & Boud, D. (2001). Learners still learn from experience when online. In *Teaching and learning online: Pedagogies for new technologies*. London: Kogan.
4. Baker, S. C., Wentz, R. K., & Woods, M. M. (2009). Using virtual worlds in education: Second Life as an educational tool. *Teaching of Psychology*, *36*, 59–64. doi: 10.1080/00986280802529079
5. Bates, A. W. (2005). *Technology, e-learning and distance education* (2nd ed.). London, UK: Routledge.
6. Beldarrain, Y. (2012). Distance education trends: Integrating new technologies to foster student interaction and collaboration. *Distance Education*, *27*(2), 139–153.
7. Bielaczy, K., & Collins, A. (1999). Learning communities in classrooms: A reconceptualisation of educational practice. In C. M. Reigeluth (Ed.), *Instructional-design theories and models, a new paradigm of instructional theory* (Vol. 2, pp. 269–292). New Jersey: Lawrence Erlbaum Associates.
8. Carr, S. (2000). As distance education comes of age. The challenge is keeping the students. *Chronicle of Higher Education*, *46*(23), A39–A41.
9. Cheung, C. M. K., Chiu, P.–Y., & Lee, M. K. O. (2011). Online social networks: Why do students use Facebook? *Computers in Human Behaviour*, *27*(4), 1337–1343.
10. Chickering, A., & Ehrmann, S. E. (1996). Implementing the seven principles: Technology as lever. *American Association for Higher Education*, *49*(2), 3–7.
11. Childress, M. D., & Braswell, R. (2006). Using massively multiplayer online role-playing games for online learning. *Distance Education*, *27*(2), 187–196.
12. Clark, M. A. (2011). Genome Island: A virtual science environment in Second Life. *Turkish Online Journal of Distance Education*, *12*(3).
13. Cobb, S. (2011). Social presence, satisfaction, and perceived learning of RN-to-BSN students in web-based nursing courses. *Nursing Education Perspectives*, *32*(2), 115–119.
14. Crawford-Ferre, H. G., & Wiest, L. R. (2012). Effective online instruction. *The Quarterly Review of Distance Education*, *13*(1), 11–14.
15. Dawson, S. (2006). A study of the relationship between student communication interaction and sense of community. *The Internet and Higher Education*, *9*, 153–162.
16. De Lucia, A., Francese, R., Passero, I., & Tortora, G. (2009). Development and evaluation of a virtual campus on Second Life: The case of Second DMI. *Computers and Education*, *52*, 220–233.
17. Edirisingha, P., Nie, M., Pluciennik, M., & Young, R. (2009). Socialisation for learning at distance in a 3D multi-user virtual environment. *British Journal of Educational Technology*, *40*(3), 458–479.
18. Ertmer, P. A., Ottenbreit-Leftwich, A. T., Sadik, O., Sendurur, E., & Sendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers and Education*, *59*, 423–435.
19. Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *The American Journal of Distance Education*, *19*(3), 133–148.
20. Giesbers, B., Rienties, B., Tempelaar, D., & Gjselaers, W. (2014). A dynamic analysis of the

- interplay between asynchronous and synchronous communication in online learning: The impact of motivation. *Journal of Computer Assisted Learning*, **30**(1), 30–50.
21. Knapper, C. (1988). Lifelong learning and distance education. *American Journal of Distance Education*, **2**(1), 63–72.
  22. LeFebvre, L., & Alle, M. (2014). Teacher immediacy and student learning: An examination of lecture/laboratory and self-contained course sections. *Journal of the Scholarship of Teaching and Learning*, **14**(2), 29–45.
  23. Leh, A. S. (2001). Computer-mediated communication and social presence in a distance learning environment. *International Journal of Educational Telecommunications*, **7**(2), 109–128.
  24. Lowe, C. (2008). Graduate student perceptions of learning in a virtual world. Paper presented at the *24th Annual Conference on Distance Teaching and Learning*, Madison, Wisconsin.
  25. McKerlich, R., Riis, M., Anderson, T., & Eastman, B. (2011). Student perceptions of teaching presence, social presence and cognitive presence in a virtual world. *Journal of Online Learning and Teaching*, **7**(3), 324–336.
  26. Murphy, E., & Rodrigues-Manzanares, M. A. (2012). Rapport in distance education. *The International Review of Research in Open and Distance Learning*, **13**(1), 167–190.
  27. Ogden, J., & Lo, J. (2011). How meaningful are data from Likert scales? An evaluation of how ratings are made and the role of the response shift in the socially disadvantaged. *International Journal of Health Psychology*, **12**, 350–361.
  28. Oztok, M., Zingaro, D., Brett, C., & Hewitt, J. (2013). Exploring asynchronous and synchronous tool use in online courses. *Computers and Education*, **60**(1), 87–94.
  29. Peters, O. (1992). Some observations on dropping out in distance education. *Distance Education*, **13**(2), 234–269.
  30. Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks*, **6**, 21–40.
  31. Reilly, J. R., Gallacher-Lepak, S., & Killion, C. (2012). "Me and my computer": Emotional factors in online learning. *Nursing Education Perspectives*, **33**(2), 100–105.
  32. Rice, R. E., & Love, G. (1987). Electronic emotion: Socioemotional content in a computer-mediated network. *Communication Research*, **14**, 85–108.
  33. Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, **7**(1), 68–88.
  34. Robson, C. (2002). *Real world research*. Oxford, UK.: Blackwell Publishing.
  35. Rovai, A. (2002). Building a sense of community at a distance. *International Review of Research in Open and Distance Learning*, **3**(1), 1–16.
  36. Russo, T. C., & Campbell, S. (2010). Perceptions of mediated presence in an asynchronous online course: Interplay of communication behaviours and medium. *Distance Education*, **25**(2), 215–232.
  37. Russo, T. C., & Campbell, S. W. (2004). Perceptions of mediated presence in an asynchronous online course: Interplay of communication behaviours and medium. *Distance Education*, **25**(2), 215–232.
  38. Simkins, S., Maier, M., & Rhem, J. (2009). Just-in-Time Teaching: Across the Disciplines, and Across the Academy (*New Pedagogies and Practices for Teaching in Higher Education*). Virginia, US: Stylus Publishing.
  39. Slagter van Tron, P. J., & Bishop, M. J. (2009). Theoretical foundations for enhancing social connectedness in online learning environments. *Distance Education*, **30**(3), 291–315.
  40. Sprecher, S. (2014). Initial interactions online-text, online-audio, online-video, or face-to-face: Effects of modality on liking, closeness, and other interpersonal outcomes. *Computers in Human Behaviour*, **31**, 190–197.
  41. St John, W., & Johnson, P. (2000). The pros and cons of data analysis software for qualitative

- research. *Journal of Nursing Scholarship*, 32(4), 393–399.
42. Steinkuehler, C. A., & Williams, D. (2006). Where everybody knows your (screen) name: Online games as "third places". *Journal of Computer-Mediated Communication*, 11, 885–909.
  43. Tait, A. (2014). From place to virtual space: Reconfiguring student support for distance and e-learning in the digital age. *Open Praxis*, 6(1), 5–16.
  44. Voogt, J., Fisser, P., Roblin, N. P., Tondeur, J., & van Braak, J. (2012). Technological pedagogical content knowledge: A review of the literature. *Journal of Computer Assisted Learning*, 29(2), 109–121.
  45. Wang, F., & Burton, J. K. (2012). Second Life in education: A review of publications from its launch to 2011. *British Journal of Educational Technology*, 44(3), 357–371.
  46. Warburton, S. (2009). Second Life in higher education: Assessing the potential for and barriers to deploying virtual worlds in learning and teaching. *British Journal of Educational Technology*, 40(3), 141–426.
  47. Zheng, B., & Warchauer, M. (2015). Participation, interaction, and academic achievement in an online discussion environment. *Computers and Education*, 84, 78–89.

**Jo-Anne Murray** is Associate Dean for Digital Education in the College of Medical, Veterinary and Life Sciences at the University of Glasgow. Jo-Anne has developed and delivered many online distance education programmes and has keen interest in collaborative online media. Jo-Anne also has experience of running Massive Open Online Courses and as such is very interested in open educational resources. E-mail: [Jo-Anne.Murray@glasgow.ac.uk](mailto:Jo-Anne.Murray@glasgow.ac.uk)

**Fiona Hale** is a Senior e-Learning Advisor, specialising in Online Distance Learning, Virtual Worlds and Collaborative Online Media, in the University of Edinburgh's Information Services. She is also the Second Life Support Officer for the MSc in Digital Education programme. Her research interests include virtual worlds in education, videogame-based learning and student learning. E-mail: [Fiona.Hale@ed.ac.uk](mailto:Fiona.Hale@ed.ac.uk)

**Marshall Dozier** is the Senior Liaison Librarian for the College of Medicine and Veterinary Medicine at the University of Edinburgh. Marshall has particular expertise in information skills tutoring. She's also interested in web-based information skills tutoring, online learning and aspects of medical education like problem-based learning and evidence-based medicine. E-mail: [Marshall.Dozier@ed.ac.uk](mailto:Marshall.Dozier@ed.ac.uk)