

Virtual Possibilities: A Constructivist Examination of the Educational Applications of Second Life

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This study surveyed post-secondary instructors in 15 countries regarding their experiences using the virtual world Second Life as a teaching tool. Qualitative analysis of responses to open-ended questions suggests that Second Life offers a great deal of potential in realizing Grabinger and Dunlap's (2000) attributes of a rich environment for active learning (REAL), as well as a number of practical benefits. However, technological barriers, institutional opposition, limited familiarity, and other concerns may be preventing instructors from fully making use of Second Life in their curricula.

INTRODUCTION

Selecting the right tools for instruction is one of the most complex yet critical duties of an instructor at any level of education. As new educational technologies emerge, instructors are faced with a wider selection of tools, as well as students with evolving modes of learning. Students who are part of the "net generation" are quite different from past generations of students. They are more comfortable with new technologies, want information quickly, multi-task well, and use several channels to retrieve information and communicate (Oblinger & Oblinger, 2005). It is the challenge of the modern educator to learn the most effective ways of using new technologies for the greatest student success.

One of the most recent tools to become available to instructors is Second Life, an online virtual world constructed mostly by its users. Though Second Life was not initially intended for educational use upon its public release in 2003, it has, nonetheless, become an important tool for instructors from over 150 academic institutions and at least 15 countries (Foster, 2007a, 2007b; Bowers, Ragas, & Neely, 2009). Instructors have already been using Second Life to teach across a variety of disciplines including architecture, physics, engineering, law, science and space, computer science, and engineering (Calogne & Hiles, 2007).

There is also a diverse range of learning activities for which Second Life may be used. It has been praised for its effectiveness in conducting group events, role-playing scenarios, and virtually exploring new places (Cheal, 2007; Conklin, 2007; Childress & Braswell, 2006). However, not all educational experiences with Second Life have been positive, as some critics argue that virtual worlds serve better as a place for play than learning (Foster, 2007a, 2007b). Others suggest that the learning curve may be too steep and technical problems may be a barrier to effective teaching (Anthes, 2007).

This study employs a survey methodology to examine Second Life's positive and negative attributes as identified by higher education instructors who have used the technology in their classes. A qualitative analysis of responses to open-ended questions regarding the use of Second Life as an instructional tool reveals the degree to which the current application of Second Life is consistent with a constructivist educational approach. Additionally, the researchers identify seven themes characterizing the practical motivations and obstacles for instructors seeking to implement the virtual world in their teaching.

LITERATURE REVIEW

As an educational theory, constructivism is based on the idea that experience provides the best mode of learning. Instruction, in the constructivist sense, relies not on simple transmission of knowledge, but in the development of skills that will allow the student to construct their own method of response to the situation presented. The instructor's role is to guide or facilitate learning as opposed to simply telling students the information (Dewey, 1938; Vygotsky, 1978). Meaning is fluid, and is constantly open to change and reinterpretation (Bednar, Cunningham, Duffy, & Perry, 1992). Effective constructivist activities also allow for reflection and articulation, often within the collaborative process. Both reflection and articulation allow for deeper understanding of environments and situations as students take time to consider the meaning of what they are doing and look for ways to communi-

cate that meaning to others. Students achieve deeper understanding through reflection by analyzing how they solved problems and how they would approach a similar problem in the future (Dunlap & Grabinger, 1996). Articulation allows students to develop and refine their thoughts as they attempt to give form to their ideas (Herrington & Herrington, 2006).

Many scholars have found constructivism to provide a solid theoretical foundation for their research into the effectiveness of various educational technology applications. Tam (2000) notes that the versatility of computer technology offers an opportunity to shift the focus of learning away from possessing knowledge and toward constructing knowledge. Juniu (2006) argues that new technologies have provided new possibilities for the development and delivery of instructional materials, but too often these technologies are used only as “productivity tools to disseminate knowledge through lectures, drill and practice, and tutorials” (p. 69). In contrast, constructivist applications of technology promote student-centered learning with real-world relevance by offering unique opportunities for interactivity, collaboration, critical thinking, problem-solving, and original creations.

The emergence of new technologies such as multi-media, the Internet, hyperreality, and virtual reality provides new opportunities for active, experiential construction of meaning (Karagiorgi & Symeou, 2005). Su (2007) found that the implementation of a constructivist multi-media environment in college science courses improved students’ scientific knowledge and performance and promoted a more positive attitude toward science. The application of multi-media in the classroom with deliberate attention to constructivist goals was shown to improve students’ abilities to grasp complex concepts and provided more opportunities for students of varying levels of scientific aptitude to succeed.

Wheeler (2001) points out that incorporating computer network technologies into instruction creates greater efficiency in the educational process through improved access to course materials, better communication, sharing of resources and work spaces, and easier management of student information. However, Wheeler argues this is a limited view of the potential of these tools. Computer network technologies can also move education toward more non-linear cognitive strategies for problem-solving, representation, and storage and retrieval that better match the ways in which humans process information. There is a temptation for students and teachers alike to gravitate toward technology in education because it seems progressive and “refreshingly different” (Ewing, 2000, p. 215). However, it is incumbent upon teachers to examine their curriculum and determine the most effective, not simply the most attractive, ways to use such technologies to improve their pedagogy.

Coffman and Klinger (2007) argue that the new “digital native” generation of learners is “seeking meaningful experiences that engage them to think critically and create new understandings that they can transfer to their real-world” (p. 31). Furthermore, they claim that virtual worlds have the potential to appeal to a variety of learning styles, but only if there is a variety of learning activities that appeal to a diverse range of learning approaches. In a traditional classroom setting, teachers must alternate pedagogical strategies to appeal to diverse learning styles, which means that any given moment, some students are blocked from understanding the lesson (Dede, Nelson, Ketelhut, Clarke, & Bowman, 2004). Virtual worlds potentially offer students the ability to constantly individualize their learning according to their own learning styles.

Mullen, Beilke, and Brooks (2007) argue that as a persistent 3-D space created entirely by its users, Second Life “provides a multi-dimensional context for situating learning, communicative tools to support discourse and collaboration, and Web integration for necessary resources and information” (p. 25). They point out that one possible educational application of Second Life is to use simulations to provide students with a chance to role-play, interview, analyze, and research avatar behavior. When these simulations are authentic to the appropriate social, cultural, and historic contexts, they allow students a way to learn through momentarily placing aside their own perspectives and assuming the perspectives of others. A virtual environment like Second Life can also serve as a practice field in which students can interact with the environment to try out skills and apply concepts in a realistic setting (Antonacci & Modares, 2008). Thus, a student may be able to operate a piece of equipment, build a park, or create original art within an authentic, but low-stakes virtual setting.

Grabinger and Dunlap (2000) suggest that there are five critical principles of a “rich environment for active learning (REAL)” that support a constructivist educational view (p. 8). The first attribute is *student responsibility and initiative*, which is characterized by intentional learning, questioning, self-reflection, and metacognitive skills. Encouraging students to take responsibility for their own learning helps to equip them with the skills necessary for a lifetime of constructing and evolving their own knowledge structures. The second attribute of a REAL is the implementation of *generative learning* activities in which students are actively involved and use tools to build work products that foster a rich understanding of the world. This means that rather than just having students accumulate a collection of facts, they are given concrete opportunities to apply and refine their knowledge through problem-solving activities.

Grabinger and Dunlap’s third attribute is an *authentic learning context*, which requires that teachers provide students with more than just an oppor-

tunity to apply their knowledge in solving problems; those problems must also reflect a real-world context that matches the experiences they will encounter outside of the school grounds. The fourth attribute of a REAL is *authentic assessment* to evaluate student performance. Authentic assessment recognizes the real-world context and complexity of applied knowledge and the diversity of multiple forms of intelligence that is often missed in traditional testing methods like standardized tests and written reports. The fifth and final attribute of a REAL is *co-operative support*, which emphasizes the social qualities of learning and meaning, requires students to work together in solving problems, and provides students with opportunities to contest and negotiate their ideas of knowledge, while at the same time promoting co-operation and confidence for group members to take risks and tackle challenges.

RESEARCH QUESTIONS

The review of the literature suggests that there are both considerable opportunities and challenges in implementing Second Life as an educational tool in a constructivist approach to learning. The following research questions provided the basis of inquiry for this study.

- RQ1: To what extent do the perspectives of post-secondary instructors with experience using Second Life as a teaching tool reflect the constructivist attributes of a rich environment for active learning (REAL)?
- RQ2: Other than constructivist applications, what themes emerge in the responses of post-secondary instructors regarding their experiences using Second Life as a teaching tool?

METHOD

The responses analyzed in this study were obtained through an online survey of 227 post-secondary instructors who had experience using Second Life as part of their course curricula. Of these, 162 instructors responded to the questionnaire sent to them, resulting in a response rate of 71.4%. Responses to questions on demographics indicated that instructors participating in the study represented fifteen countries and twenty-five different academic disciplines, with eighty-four (51.9%) of the respondents male. The average age of the respondent was 45 years old with a range from 24 to 71. The respondents had been teaching in higher education for an average of 12 years and spent a median of five hours per week in Second Life.

From the collected sample of completed surveys, two of the researchers conducted a qualitative analysis on free-text responses to the following five questionnaire items:

1. Overall, what do you like about using Second Life as an educational tool?
2. Overall, what do you dislike about using Second Life as an educational tool?
3. What features of Second Life were most important in enhancing your students' learning?
4. If you DO plan to use Second Life in future classes, please explain how you will use it.
5. If you DON'T plan to use Second Life in future classes, please explain why.

Specifically, the two researchers first divided the responses in half and independently coded responses to identify those that demonstrated Grabinger and Dunlap's (2000) five attributes of a REAL: 1) authentic assessment, 2) student responsibility and initiative, 3) generative learning strategies, 4) authentic learning contexts, and 5) co-operative support. Additional emergent themes were also identified as they appeared in the responses.

The researchers then met to compare initial findings and determine agreement on the themes. The entire set of responses was then collaboratively recoded, with the researchers negotiating agreement upon the presence of themes in each individual response.

RESULTS

Analysis of the responses indicated there were varying levels of support for all five of Grabinger and Dunlap's (2000) constructivist attributes of a REAL. In addition, seven themes not directly related to constructivist goals emerged as motivating or demotivating factors influencing the perception of Second Life as a teaching tool.

Constructivist Principles of a Rich Environment for Active Learning

Authentic assessment

Though important to a rich environment for active learning, authentic assessment was found only seven times as a theme in this analysis. This was the lowest total of all 12 themes identified in this project. Five of these seven occurrences were represented by instructors' future plans for using Second Life as an educational tool. One example came from an instructor who planned to have business students set up a real business as a form of assessment. Other responses that exhibited authentic assessment discussed creating "dynamic interactive quizzes" and building exhibits for final projects.

Student responsibility and initiative

This theme was the fourth most frequent theme found in the qualitative analysis. It appeared 92 times throughout the study, most often reflecting what the instructors liked about using Second Life and their plans for using the program in future classes. Responses included such terms or phrases as, “development of decision-making skills,” “role-play,” “engagement,” “a new way of thinking,” and “creative thinking.” Many of the responses that contained this theme discussed how the use of Second Life helped students gain control of their learning through a variety of projects that use Second Life as the major tool. One instructor responded, “It has a potential lost to mass education, the ability to stimulate a creative intelligence and transform students.” Some instructors saw using Second Life as a chance for student exploration of a new environment as represented by one instructor’s response that Second Life is “not just a walled garden where only our students have access but a whole world to explore and interact with.”

Another consideration for instructors who discussed the student responsibility and initiative theme was the possibility for students to examine multiple methods of reaching a goal or as one instructor put it, “there is more room for ‘creative experiment’ for the students; it provides a fascinating juxtaposition with ‘normal’ and institutional classroom conventions.” Many instructors planned to take advantage of a wide variety of resources available in Second Life by having students explore several examples of user-generated content. Instructors often encouraged students to consider these ideas as well as those of classmates to create their own method for completing the assigned task.

Respondents also discussed capitalizing on Second Life users’ large amount of control over their representation as an opportunity to consider identity formation. Some instructors asked students to alter avatars and objects for a greater variety of experiences, and remarked that discussion of these experiences provided insight into the concept of reality itself.

The few negative responses for this theme came from instructors seeing Second Life as a “distraction” or requiring an amount of exploration that the students would not follow through on. Another complaint came from instructors who felt students spent too much time on developing their appearance and not enough time completing learning objectives.

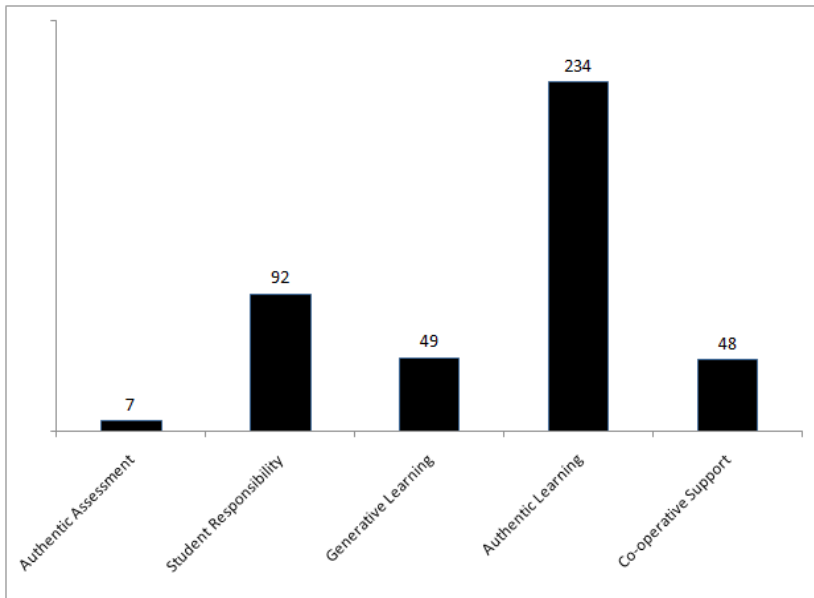


Figure 1. Frequency distribution of responses containing constructivist attributes of a rich environment for active learning (REAL)

Generative learning strategies

There were 49 responses in the analysis that reflected some form of generative learning strategies. Twenty-seven of the total responses came as an explanation of how instructors would use Second Life in future classes. Most of the responses that involved generative learning strategies included the terms “build” or “create” in reference to constructing some sort of product or presentation in the virtual environment. More specific responses that contained the generative learning strategies theme were “venue for student projects,” “build up a virtual classroom,” “project-based learning,” “designing ‘thematic’ environments,” “we will make movies inworld,” and “exhibition of art.” Many instructors felt that Second Life provided useful building tools that allowed students to “engage with highly conceptual ideas that they could express visually.” A number of respondents indicated that Second Life’s building functions provided unique possibilities for students to be a part of constructing their own learning environments, as seen by one instructor who remarked, “I love the ability to create immersive environments, but more importantly for the students to be able to add to the world.”

Negative versions of this theme were few and only present when instruc-

tors felt the students were unable to create the kinds of objects they intended to create.

Authentic learning contexts

The authentic learning contexts theme was the second most prevalent of all the themes in the analysis. It appeared 234 times, mostly in positive responses to what features the instructors felt were most important to their students' learning, what the instructors liked about using Second Life as an educational tool, and how the instructors planned on using Second Life in future courses. An important form of authentic learning contexts mentioned by a large number of instructors was the ability to "simulate a real environment," extended to simulating a real classroom as well as an environment that pertained specifically to the skills being learned. One instructor described Second Life as "the tool that mostly is near a Real Life experience." Instructors teaching online courses cited the ability to create a more authentic learning environment than is available in most online instruction, a tool that is "visually engaging, far more than a text-based distance learning class/environment." The ability for students to discuss topics and interact with the professor in real time represented a more realistic classroom for those involved in distance learning.

Other instructors used terms like "social presence" and "communication" to indicate the benefits of using Second Life to interact with others as is possible in the real world. More specific responses included discussion of students using Second Life to "conduct 'social marketing' consultations with non-profit groups to help build support for them." One instructor teaching a management class described using Second Life "to solve case scenarios and present findings." The term "immersion" appeared several times and was included in this theme due to its use in describing how real the environment seemed to the students. Instructors were concerned about creating an environment that felt real to the students and would be taken seriously as an avenue for instruction.

The few negative forms of authentic learning context were seen as the student's inability to become immersed in the environment, whether through technological difficulties or inability of the student to see the virtual environment as real.

Co-operative support

Co-operative support appeared 48 times in the analysis, particularly in regards to what the instructors thought was most important in enhancing their students' learning and how they planned to use Second Life in the future. This theme manifested itself through such terms as "team building exercises," "group projects," "co-creation," "collaborative enterprises," and

“students helping each other.” One instructor highlighted by stating, “Students can work together and feel the presence of another human.” It is important to note that some responses simply used the term “collaboration” without reference to student involvement. In some cases instructors mentioned the opportunity to collaborate with other instructors as a benefit of using Second Life, which is not representative of co-operative support as used in the current constructivist context. Therefore, only those responses that made it clear that students were actively working together were categorized as co-operative support. Negative co-operative support responses were few and focused on difficulty in using the technology for interaction or the instructor’s desire not to use collaborative methods.

Other Emergent Themes

Technology

The most prominent of all themes identified in the instructors’ responses was technology. This theme appeared 243 times across responses to all five items. The majority of references to technology were found in response to the question regarding what instructors dislike about using Second Life as an educational tool, where it appeared 133 times. Technology was identified as the number one obstacle regarding the use of Second Life in education. Instructors frequently referenced a “steep learning curve” for students and complained that the technology was not user friendly. In addition, respondents indicated frustration with the program’s “technical instability,” “constant crashes in the system,” “service outages,” “lag,” “no integration of other systems (e.g. in world browser),” “inability to backup outside of software,” and “constant updates.” The responses showed a consistent sentiment that technical instability, continuous software redevelopment, and a lack of compatibility with other technology systems and instructors’ needs, all contributed to expenditures in valuable time to address technical issues.

Similarly, many instructors commented that the hardware and bandwidth requirements of the program were prohibitive. In some cases, institutions did not have computers that met the necessary system requirements to run Second Life. Likewise, many instructors said that they were unable to receive the support they needed from their school’s information technology staff because in-house technicians and system administrators were not familiar with the program. In addition, some instructors expressed frustration that students did not have personal computers that supported the technology requirements, or that it was difficult for students to come to campus where they could use computers that did meet the necessary requirements.

There were, however, also positive responses related to the technological capabilities of Second Life. Instructors pointed to the educational benefits afforded by Second Life's "building tools," "animated graphic environments," "scripting," and "voice chat" features. Some respondents indicated that Second Life was effective in providing an integrated multimedia environment for meeting their teaching needs. One instructor indicated that the "ability to stream sound, upload movies and PowerPoints, still have links to Web-based teaching and learning materials" and the "ability to record in-world conversations with ease" all contributed to enhanced student learning. Similarly, some respondents mentioned that Second Life provided technological opportunities not offered in other traditional e-learning programs by combining "synchronous" and "asynchronous" capabilities in a "3D environment." The technology theme further emerged in a positive manner as instructors commented that simply exposing students to Second Life was beneficial because it introduced them to the technology of virtual worlds.

Professional support

The theme of professional support was demonstrated in the data as respondents frequently referred to the presence or absence of supportive resources for teachers and students in both the real world and virtual world. While this theme was less dominant than others – occurring only 45 times – it still arose frequently enough to evidence a consistent consideration among instructors. For example, some respondents commented that one benefit of using Second Life in their curricula was that it provided students with a number of "professional networking" opportunities. Some instructors stated that there was a strong basis of support among the in-world Second Life educational community that helped them pursue their own teaching goals. One respondent mentioned that the "SL Educators list is invaluable," while others commented that they liked the "openness and support within the educational community" or "meeting like-minded people."

The professional support theme was also demonstrated through the fact that some respondents said that they had plans to assist other faculty and staff at their schools in learning more about using Second Life. However, the dimension of real-world academic support usually emerged in a negative context. One respondent complained of receiving "ongoing ridicule from colleagues," while others mentioned that they faced "other educators' fear of change and technology," or "the perceived idea from colleagues and some students that it is just a game." Still others indicated that they faced "administrative barriers," and "bureaucratic hurdles" to using Second Life at their institutions. One instructor did not plan to use Second Life in future classes because the "human subjects protection committee had trouble getting their heads around it."

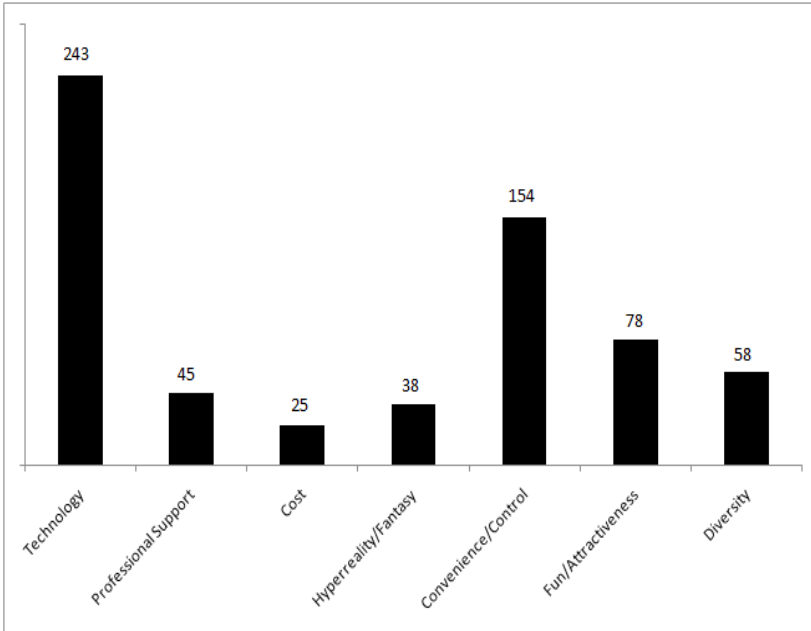


Figure 2. Frequency distribution of responses containing other emergent themes

Cost

Appearing only 25 times in the overall responses, cost was second only to authentic assessment as the least prevalent theme that emerged in this study. While user accounts are free in Second Life, one must buy virtual land with real money if they wish to build persistent structures in Second Life or have rights to meeting spaces. Thus, some instructors commented that they liked “the fact that it can be explored for free,” and it was “low cost to students.” However, the majority of respondents who referred to cost did so in a negative context, complaining of “ludicrously expensive land costs,” and “problems with finance for islands.” Similarly, some instructors noted the challenge of providing students with the necessary funds to upload their work products, such as slide shows or posters. One instructor pointed out, however, that the virtual world provides an opportunity to create things that could not be created in real life because of limitations in cost and natural laws of the physical world.

Hyperreality/fantasy

While appearing only 38 times in the responses, the appeal of being able to build and do things in the virtual world that are physically impossible in the real world emerged as a theme of hyperreality/fantasy. For example, some respondents mentioned that they liked the ability to fly and teleport in Second Life. One instructor noted specifically that the “ability to visualise imagined places” was important in enhancing student learning. Another respondent likewise commented that “the ability to build larger than life items to teach complex topics,” was an effective educational tool. Others provided similar statements in saying they liked the opportunity to “build up learning environments like holo-decks for innovative learning scenarios,” or “to create an environment without typical real world boundaries like gravity.”

Convenience and control

Convenience and control was the third most dominant theme found in the data, appearing a total of 154 times. Positive references to this theme frequently expressed the logistical benefits of using Second Life as a teaching tool. For example, one instructor commented that “we could save logs from the class discussions so that students could review them later.” Other respondents mentioned that the persistent online environment allowed students in dispersed geographic locations to meet or access resources at any time of day. Similarly, a number of instructors indicated that they had used, or intend to use, Second Life as a way of having guest lecturers who live far away speak to the class without facing the constraints of time and money associated with real-world travel. The ability to tailor a class for specific needs of the teacher and students manifested as a facet of convenience and control. One respondent commented that the fact you can “build what you need” was important for enhanced student learning, while another was in the process of structuring “a learning environment specifically for my students.”

Some instructors did not see Second Life as practically useful for them. However, negative references to convenience and control generally revolved around issues of virtual safety and the commercial nature of Second Life. A number of respondents mentioned that “griefing,” “people ‘attacking’ areas” where they were trying to hold class, or “being distracted by outside visitors” were consistent problems with using the technology. Other instructors complained of the “sexual aura around the world,” “nudity if meeting in non-private spaces,” and that “adult themes at times hinders the learning process.” A frequent complaint relating to Second Life’s commercial nature was that as a privately owned online technology, the program and all its contents are ultimately controlled by its creators at Linden Lab. “Progress is hindered by the fact that Linden Lab seeks to impose its definitions of education and student life on our virtual campus,” wrote one respondent. Such

“commercial restrictions” had led one instructor to explore another virtual program, OpenSimulator, as an alternative teaching tool.

Fun and attractiveness

The data provided strong support – 78 of all responses – for the presence of a fun and attractiveness theme in instructors’ perceptions of Second Life. Some respondents indicated that the “novelty,” “informal atmosphere,” and “game” nature of the virtual world was “stimulating” and promoted “student enthusiasm” and “creative interest.” Other instructors commented that they “enjoyed the ‘weirdness’ of SL,” or its “playfulness,” and described it as “very appealing,” and “fun.” One respondent noted that students’ “excitement about the new world and its possibilities in terms of creativity, learning and social interaction” helped to temper anxiety over their unfamiliarity with virtual worlds and the steep learning curve.

While most responses representing the fun and attractiveness theme were positive, there were negative examples as well. “Some students feel like they are wasting their time playing dolls,” wrote one instructor. Other respondents mentioned that students find it “not compelling,” “lame,” and “won’t be impressed unless our builds can come closer to the quality they experience in WOW [World of Warcraft] or Grand Theft Auto.”

Diversity

Diversity emerged as a theme in 58 of the responses and was generally positive. This theme manifested in the forms of both human diversity and diversity of concepts and subject matter. One respondent commented that “interaction with real people from different cultures and universities as well as the ability to experience different cultural environments,” was important for enhancing students’ learning. Similarly, other instructors mentioned that they liked the “global exposure,” “international perspective,” and “transcending prejudices based on appearance.” From a negative perspective, one instructor stated, “I also found that SL participants represent a fairly narrow slice of the global population (upper middle class, e-connected, with huge amounts of leisure time).” An instructor who spoke English as a second language expressed frustration with the lack of support in his/her native language.

While less frequently mentioned than human diversity, reference to a diversity of concepts and subject matter was also found in some of the responses. Some instructors provided information on the variety of ways they had used, were using, or intended to use Second Life to teach a diverse range of classes. Other instructors indicated they liked the diversity of resources available in Second Life. One respondent liked the fact that Second

Life opened up “broader questions such as the use of a private world for public teaching, and questions of public space and democracy.”

DISCUSSION

Responses from instructors using Second Life as a teaching tool suggest there is a great deal of potential in realizing the constructivist potential of Second Life as a rich environment for active learning. The fact that an authentic learning context was the second most prominent of all themes in this study, and usually referenced in a positive context, suggests that instructors using Second Life see it as a way to create realistic learning environments specific to their learning objectives. Instructors appear to believe in the constructivist idea that learning in an authentic context makes concepts more transferable to the real world. The fact that student responsibility and initiative was the fourth most frequent theme in the analysis lends support to the constructivist principle that true understanding emerges when students are given more control over the learning process and are responsible for their own learning. The presence of a large number of responses regarding the involvement of identity in the learning process shows that reflection and the students’ understanding of self is important to many instructors and can be facilitated by using Second Life for instructional purposes.

Given Second Life’s unique capabilities in terms of building content and communicating with others, one might expect more than the moderate evidence for generative learning strategies and co-operative support found in this analysis. It is clear that some instructors are using the creative and social capabilities of Second Life in their instruction. However, technological barriers or a lack of time to explore this component of constructivist learning may be preventing instructors from fully realizing the generative and co-operative potential of the virtual world. The low level of support for authentic assessment as a constructivist application of Second Life suggests that instructors might not be at a point where they have developed sophisticated methods of measuring students’ learning progress. This is definitely an area that needs more thought and experimentation. As instructors become more familiar with the technology, especially for instructional purposes, it is likely they will begin to develop effective forms of assessing their students’ learning.

The themes that emerged beyond consideration of the constructivist potential of Second Life suggest that there are both opportunities and challenges of a very practical nature that will influence the future adoption or continued use of Second Life in higher education. Overwhelmingly, the foremost concern among instructors is the technological barriers to applying the virtual world in their teaching. While Second Life presents some novel

and useful technological opportunities for teachers, these opportunities will not be fully realized unless Second Life becomes more stable and schools provide the necessary hardware, software, and technical staff support for instructors to effectively carry out class activities. Similarly, until those instructors using Second Life feel as valued by their real-world institutions and colleagues as they do by their fellow in-world educators, academic stigma is likely to impede further exploration of the educational benefits of the virtual world.

This requisite esteem and support includes an attitudinal appreciation among academics for the work being done by educators in the virtual world, but it must also include tangible support in the form of funding. While Second Life provides an opportunity for free exploration of the virtual world, developing new in-world educational sites and applications will require some level of monetary resources. As some instructors pointed out, however, the project costs for elaborate buildings or programs in the virtual world are significantly less expensive than equivalent projects in the real world. This could, in the long run, provide innovative cost-cutting opportunities for institutions looking to rein in spending and overhead. Moreover, the virtual nature of Second Life offers opportunities to experiment in developing structures and activities that cannot be duplicated within the natural limitations of the real world.

An attractive attribute of Second Life for instructors is the ability to custom design an educational environment. The combination of multimedia and multisensory capabilities, along with the ability to manipulate and tailor an online real-time environment, offers a great deal of flexibility in when and how instructors interact with their students. However, instructors become frustrated when this convenience and control is jeopardized by outside commercial interests or concerns for students' safety. Full implementation of Second Life in academia will require greater opportunity for educators to customize their learning environments and the ability to opt out of exposure to the aspects of the virtual world they consider non-constructive to student learning. Furthermore, if students are excited by a stimulating and engaging virtual environment, and if instructors can tap into this enthusiasm for effective educational purposes, programs like Second Life offer a fun and self-directed way for students to learn in a world of diverse experiences. However, if such pedagogical efforts cannot compete with the immersive video games that are popular in students' extracurricular lives, virtual learning will smack of inauthenticity and be seen as a lame attempt by out-of-touch educators to connect with a new generation of students.

LIMITATIONS AND FUTURE RESEARCH

Most of the responses to the open-ended questions posed in this project gave interesting insights into how higher education instructors have been and will be using Second Life as an instructional tool. However, some of the responses were very short and provided only vague answers to the questions posed. For such responses, it was difficult for the researchers to assign significant meaning and, in a few cases, responses had to be dismissed altogether. Future attempts at research in this area may look to other tools of qualitative and quantitative research such as focus groups, in-depth interviews, and longer more specific questionnaires that quantitatively categorize the themes identified in this study in order to gain a deeper understanding of instructors' thoughts on using Second Life as an instructional tool.

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