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Conceptual Paper
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Purpose: To identify and explore the dynamics of an emerging form of teaching and learning--social network knowledge construction--associated with the use of social networks, particularly 3D virtual world environments such as Second Life. As social network technologies not only frame the way individuals' interact and learn, but actually impact a learner's thinking process and development of future consciousness, new pedagogies are needed to effectively integrate these communication mechanisms into the learning environment.

Design & Findings: Discusses the purpose and potential use of these networks in the teaching and learning process. Distinguishing features of social network knowledge construction as an emerging pedagogy are identified. Strategies for incorporating a variety of identified social networks, both in and out of virtual worlds, for teaching and learning are noted.

Research limitations/implications: The focus of this emerging pedagogy is framed within the social networks surrounding Second Life, in particular, although the pedagogical framework could be applied across any set of social networking applications.

Practical implications: Provides critical information currently required by the early to mid-adopters of social networks and virtual worlds for teaching and learning.

Originality/value: This paper identifies an emerging form of pedagogy that has yet to be fully discussed in the literature, and supports the special issue's emphasis on future-focused learning.

1. Introduction

Virtual worlds are 3D internet-based immersive simulation environments, and although one can play games inside a virtual world, they are not games. Users interact in virtual worlds through their avatar, a virtual representation that may or may not resemble the actual user. Users can move through space, interact, participate in events, and communicate. The user has the ability to build everything in the virtual world, a highly distinguishing feature of this particular technology. While virtual worlds are a form of social networking technology, they can also be viewed as highly complex social systems, consisting of norms, mores, cultures, sub-cultures, economies, families, and political systems. Although we have had at least ten years of 3D virtual environments used for gaming purposes, virtual worlds are a relatively new form of social technology used to simulate many real and imaginary aspects of daily life.

Figure 1. Students in Second Life.

In the *Structure of Scientific Revolutions*, Kuhn (1962) elaborates on the epistemological paradigm shifts that typically occur with the development of new communication technologies, such as the printing press which made books widely available to a large audience, or the internet, supporting a shift to a knowledge-based society and economy. Social networking technologies and virtual worlds are now having this influence on the way we do our work and socialize, as well as on teaching and learning. In this special edition of *On The Horizon*, Lombardo encourages us to consider how to teach to encourage the development of future consciousness. Social network technologies can play a role in this development due to their functionality and community-building design. Pink (2005) proposes that we are now moving from an Information Age to an era of "The Conceptual Age" due to the increasing ability of performance technologies, such as spreadsheets and databases, to handle tasks associated with left-brain and linear thinking. Social networking tools have the potential to support more right-brain forms of interaction and shared knowledge construction, as part of this evolution toward a Conceptual Age.

The use of virtual worlds to support learning, especially in higher education, is gaining much attention in the media. Recent articles in *The Chronicle of Higher Education*[1] and *University Business Magazine*[2] detail some of the benefits and pitfalls that universities and instructors are encountering when integrating the use of virtual worlds, such as Second Life (SL), as part of a student's learning environment. However, less is known and documented about how to effectively integrate virtual worlds, and their surrounding social network communication mechanisms, into the actual design of instruction itself. Exactly how can an instructor support self-directed learning and knowledge construction using the social networks available in and around virtual worlds such as SL?

The purpose of this paper is to identify the dynamics and mechanisms of *social network knowledge construction*, an emerging pedagogical framework associated with the use of social network communication mechanisms located in and around 3D virtual world environments. As social network technologies not only frame the way individuals' interact and learn, but actually impact the thinking process itself, new pedagogies are needed to effectively integrate these communication mechanisms into the learning environment.

2. Tools for social networking

A social networking site is an online site where a user can create a profile and build a personal network that connects him or her to other users for a variety of professional or personal reasons. Examples of social networking tools include:

- Social sites: MySpace, Facebook, Twitter
- Photosharing: Flicker, PhotoBucket
- Videosharing: YouTube
- Professional networking sites: LinkedIn, Ning
- Blogs: Blogger.com, Wordpress
- Wikis: Wikipedia, PBWiki
- Content Tagging: MERLOT, SLoog
- Virtual worlds: SL, Active Worlds, There, Whyville, Club Penguin, HiPiHi

Blogging, video sharing, wiki-editing, tagging content, or participating in a virtual world conference are all examples of the unique forms of communication and community building associated with the use of social networks.

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[1] Bugeja, M. (2008). Second Thoughts About Second Life" available at: http://chronicle.com/jobs/news/2007/09/2007091401c/careers.html (accessed 2 February 2008).

[2] Goral, T. (2008), Sizing Up Second Life: Higher Ed Learns How to Live in a Virtual World accessed at: http://www.universitybusiness.com/viewarticle.aspx?articleid=1023

SL launched in 2003, took almost four years for its user base to reach one million (Oct. 2006), and now has 13 million user accounts. Growth in virtual world usage is predicted to be strongest among kids and teens, with Club Penguin predicted to have 30 million users this year (KZero Research, 2007). There are over 100 virtual worlds currently in existence or planned for launch this year.

3. Prominence and impact of social networking

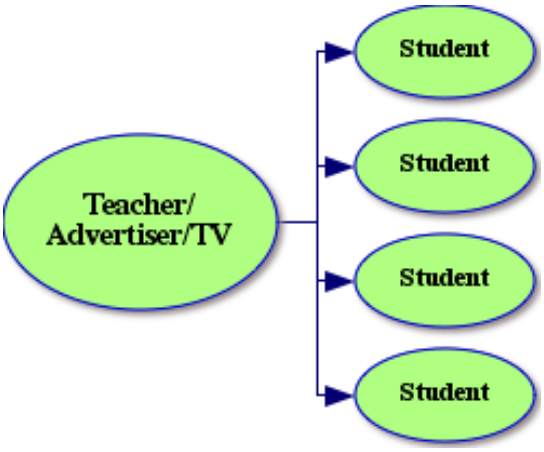
In the past five years, networking sites have rocketed to involve tens of millions of internet users, and are gaining prominence with both adult and teen users.

- 55% of teens and 82% of undergraduates use social networking
- 28% of teens have blogs
- 28% of internet users have tagged or categorized content online such as photos, news stories, or blog posts
- 48% of internet users have been to video sharing sites such as YouTube (Madden, 2007; Lenhart, et al, 2007; Rainey, 2008).

It is important to understand these trends as they relate to incoming university students, and the exposure they have had with social networking as a communication mechanism. Younger students are learning through the technology itself that they have a role to play in the development of knowledge. Consider the student who comes to college having had years of experience with text messaging, taking online courses, using virtual worlds, and perhaps blogging or participating on discussion boards. Once in the university setting, they are often asked to sit in rows and listen to lectures, take notes, and be quizzed. This incongruence in the ways students have learned in the past may conflict with what they may encounter in college, creating the potential for disengagement, learning problems, or retention issues.

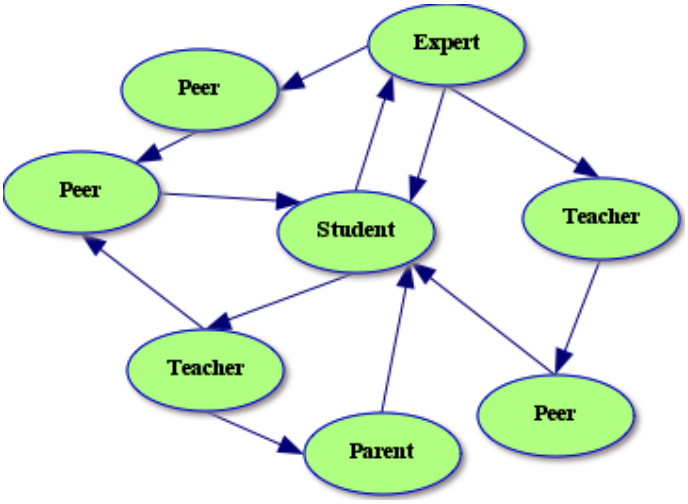
Historically, mass communication and teaching since the Industrial Age has involved transmission from a main source, whether it is a teacher, the TV, or an advertiser, out to many passive recipients. In this scenario below, who is the credible authority? Whose voice counts in the construction of knowledge? As a passive consumer of knowledge, students involved in this type of learning aren't provided the tools or skill set to develop their own dispositions to be self-directed learners and constructors of knowledge.

Figure 2. Historical communication pattern in teaching and media.



Compare that diagram to the one below, which illustrates a simplified communication pattern involved in social networking. All users now have multi-directional communication supported among multiple parties. The communication patterns enabled by social networking technologies mirror the exact process many educators seek to support in self-directed learning based on constructivist and constructionist (Papert, 1991) learning theories. These communication mechanisms are empowering and engaging to learners, and support Lombardo's call for education to "contribute to the ongoing evolution of human society."

Figure 3. Communication pattern using social networks.



It's important to acknowledge that credibility and expertise in social networking comes from the extent of involvement in the network, including the amount of participation and the frequency. Teachers and students must gain "avatar capital" (Castronova, 2001) through ongoing participation in virtual world networks to develop their credibility as a network member. What does this mean for a teacher in virtual worlds? A teacher must become a facilitator in the network, integrate these tools into their teaching, and learn to model, facilitate, and assist students in the successful use of networks to achieve learning goals.

4. Social network knowledge construction

The 2007 Horizon Report identifies several key technology trends in higher education over the next five years:

- user-created content,
- social networking,
- and virtual worlds.

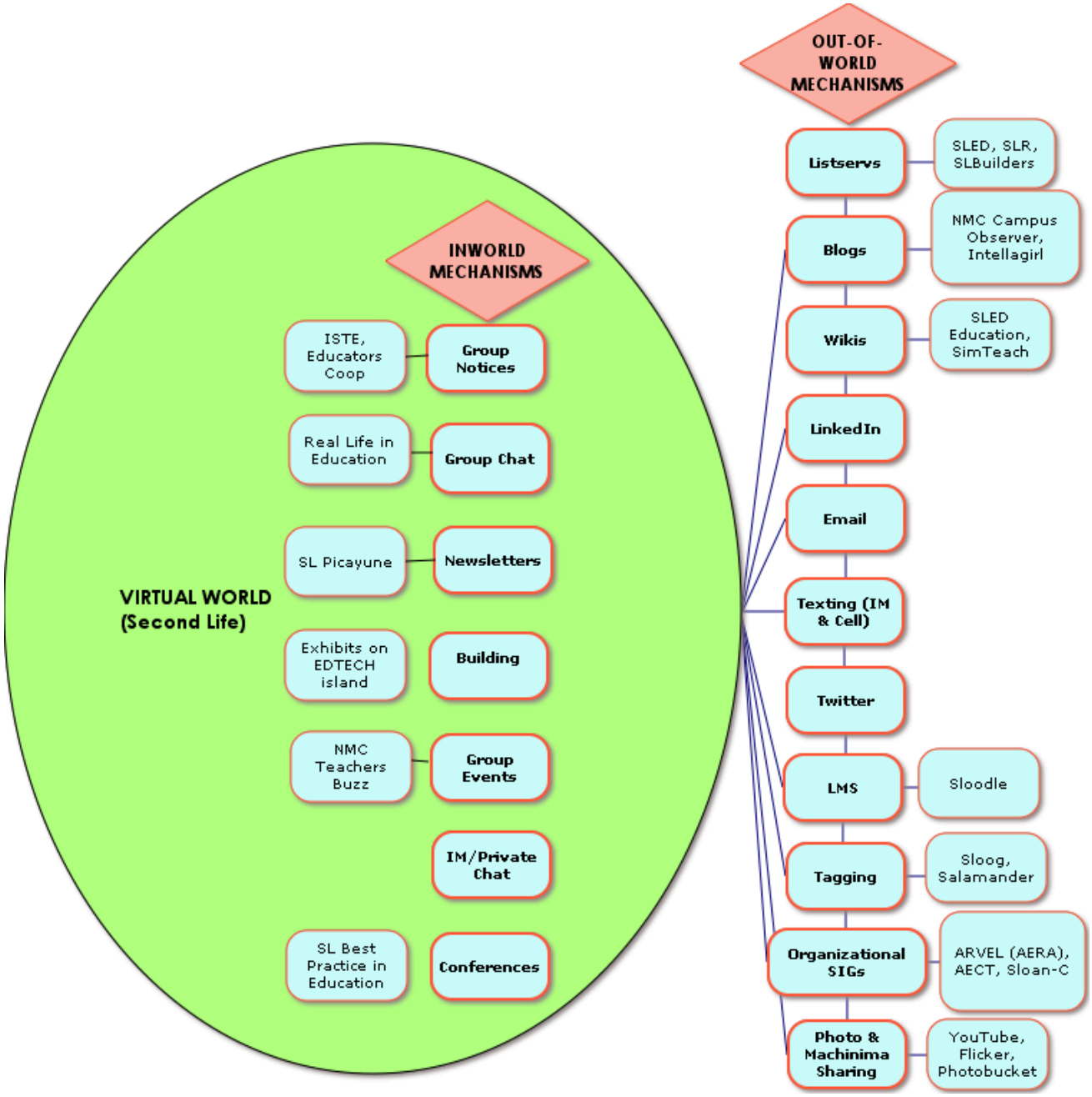
Social network knowledge construction (SNKC) provides a framework for incorporating these trends into the instructor's teaching repertoire.

This section details the distinguishing features of SNKC, both inworld and out-of-world, provides examples of SNKC, and offers a matrix for designing learning activities that considers 1) the learner's prior experience with virtual worlds, and 2) their previous level of engagement with knowledge construction via the use of social network technologies.

4.1 Distinguishing features of social network knowledge construction

Virtual worlds are unique to the online learning environment in that they don't exist in a vacuum. Rather, users have access to many inworld and out-of-world social networks while learning in the virtual world environment. In learning to master the communication opportunities and tools available to the educator in virtual worlds, time is required to familiarize oneself with the inworld and out-of-world mechanisms supporting one's own subject area, in particular. In the figure below, we see identified inworld and out-of-world communication mechanisms in SL, and specific examples used by educators, that can be used to support SNKC.

Figure 4. Mechanisms and examples of SNKC in and around Second Life.



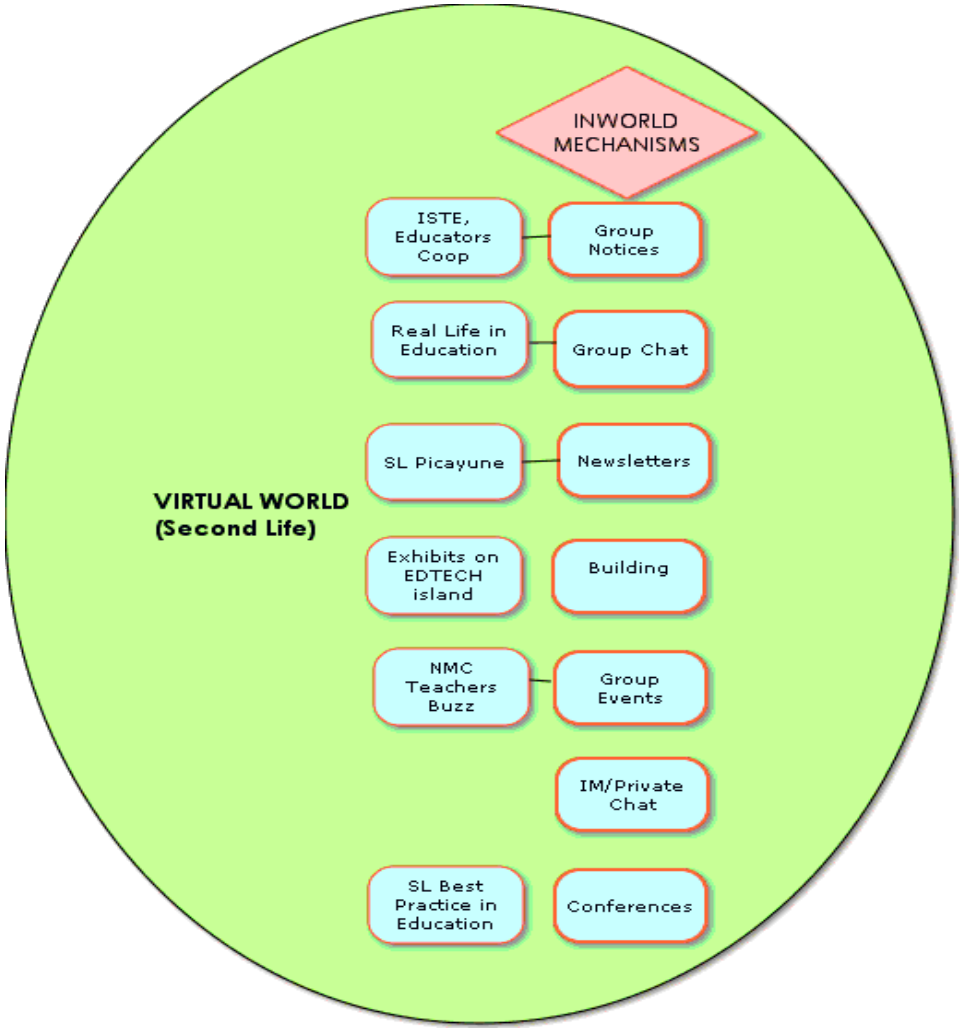
Community networks serve powerful social needs of virtual world learners, including the ability to contact friends and colleagues, participate in social, educational, and political activities, and to create channels for mobilizing around learning related efforts (Haase et al, 2002). To build social systems in virtual worlds, a variety of communication mechanisms are required to interconnect actions and events (Provost, 2008). A unique attribute of virtual worlds is their ability to cross-communicate outside the system, as well. For example, a user can send email from the virtual world to a peer's web-based email, or can write in a blog while inworld that will instantly appear on their blog based on the web.

A second distinguishing feature of virtual worlds is that they provide an opportunity for not only supporting the social construction of knowledge within and between individuals, but also offer an environment that supports the literal physical representations of that knowledge construction. Much like the creation of a paper, or portfolio of artifacts that a student might complete during a traditional course of study, in the virtual world students have opportunity to represent their knowledge using a variety of formats. That knowledge construction and representation can then be utilized by others at future dates to extend learning.

4.2 Inworld mechanisms for social network knowledge construction

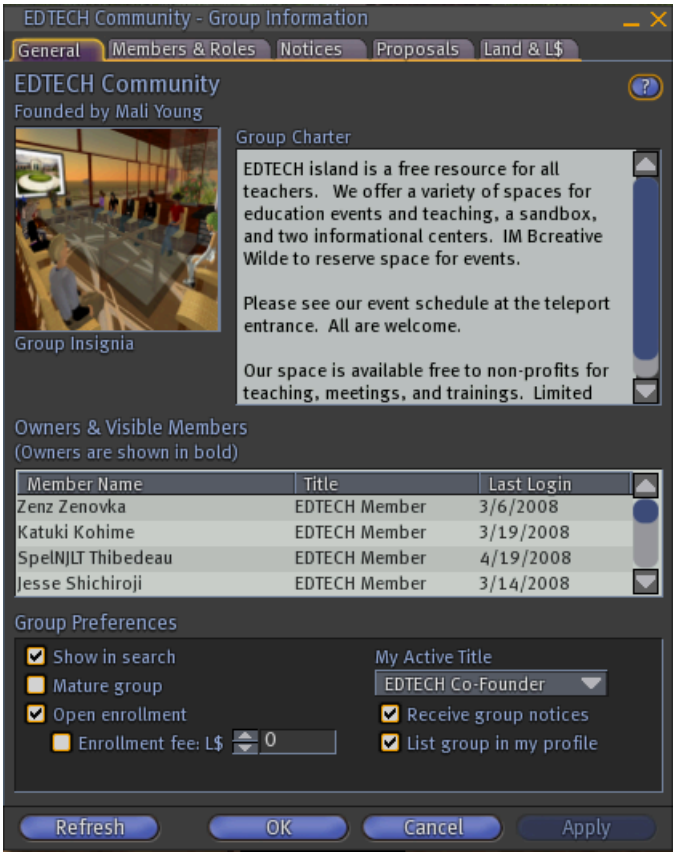
In the figure below, we see examples *inworld communication mechanisms* that the educator has available to support knowledge construction in SL. Some of these include the use of group features (group notices, group chat, group-related events), newsletters, inworld conferences, IM and private chat, and building. Examples these mechanisms are provided in the field of education, although this framework could easily apply to many other fields such as fashion, business, science, or psychology.

Figure 5. Inworld mechanisms for SNKC.



Group notices. The ability to create a group and invite members offers a powerful form of social inworld networking. A group can be created around any topic area or for a group students enrolled in a specific course. This mechanism provides an instructor and students a means to leave notices, and to talk privately as a group. Individuals with common interests can also create a group, have discussions, and notify members of events that are of interest to those particular group members, such as providing an announcement of a scheduled guest speaker. Use of the "notice" feature in SL groups has shown to impact traffic levels and social interaction opportunities when announcing a new exhibit, for example (Dawley, 2007). Two educator groups in SL that make strong use of the group announcement feature are ISTE (Information Society for Technology in Education) and Educators Coop. Each of these groups sends out notices of events related to education on a weekly basis.

Figure 6. Screenshot of group information in Second Life.



Newsletters. By creating a note card in SL, one is able to develop an inworld newsletter or informational item. Students can accept subscribers to their newsletter, and generate latest in and out-of-world news on a given topic. Pictures and landmarks can also be included in newsletters, allowing the reader to teleport to a particular location of interest. *SL Picayune*, started by Ross Perkins at Virginia Tech, is an example of educator-related newsletter.

Conferences. Many organizations are now holding inworld conferences. Sometimes these conferences are simulcast from real life into SL, and vice versa. They are also recorded and made available for later viewing. An example of this is the *Second Life Best Practices in Education Conference*, held annually in SL. Archives of presentations are available online at SLCN.TV.

IM/private chat. All virtual world environments offer the ability to chat not only as a group, but to also IM or private chat with individuals using both text and/or voice. Users create a "friend's list," that gives them quick access to IM other users in SL. Private chat can be used to have one-on-one conversations between instructors and students, between students, and to IM experts on a given topic area to gain more information.

Building. A major strength of the virtual world environment is the ability for the user to construct the world around them. Unlike gaming engines that provide the setting, content, and storyline for the user, users in virtual worlds generate the terrain, buildings, objects, and activities. With minimal training, educators are able to take advantage of this capability to not only design and create educational learning environments, but also teach students to participate in building that exemplifies evidence of their learning. For example, students might engage in an inquiry project for class wherein they find several solutions for their inquiry. Students can share these solutions in the form of inworld slideshows that can be grouped in an exhibit and made available for public presentation. In this way, student knowledge can be made available 24/7 for others.

4.3 Out-of-world mechanisms for social network knowledge construction

As internet-based technologies continue to evolve, so does their interconnectedness. In addition to the inworld social networking mechanisms described above, there are many "out-of-world," or other internet-based, communication mechanisms that support learning in virtual world environments (see figure below). Users will find these alternative communication mechanisms exist for almost any given subject area. For example, the "Fashionista" blog draws a huge following from those interested in both fashion and SL. The author reviews various clothing designers and stores in her blog, and as a result inworld traffic to these locations, and sales, can increase substantially.

Figure 7. Out-of-world mechanisms for SNKC.

Listservs. Two popular listservs for educators include the SLED (Second Life in Education) and SLR (Second Life Research) lists. Through the listserv, users are able to communicate via email about educational and research activities in SL, and develop a social network with those participating on these lists. Information and research is shared, event notices are sent out, and relationships are built and maintained.

Blogs. Owner-maintained blogs are becoming a very popular form of communication. Many educators maintain blogs of their activity in SL. NMC Campus Observer is a popular blog for educators, providing news coverage of the many events they offer in SL.

Wikis. Wikis provide the opportunity for co-construction of web pages on a given topic. Popular wikis for educators in SL include the SimTeach wiki and the SLED Education wiki. These wikis can provide SLURLs, a Second Life URL which teleports the user directly from the webpage to a location within the virtual world environment.

Professional & social networks. Several networking sites, including LinkedIn™, Facebook™, and Ning™ have established SL educator groups. Through these groups, members are able to access and communicate with individuals with common interests, send notices and questions out the group, locate contact information, and build relationships.

Email & texting. As mentioned, users can email and text between virtual worlds and real life. If a student wishes to contact an instructor while in SL, they can send an IM, for example, and it will appear in the instructor's regular email account. This allows for communication to occur across platforms, not requiring the instructor to login to communicate.

Tagging. Tagging is the process of associating keywords with online content. Tagging enables future users to be able to easily locate the information via the tag. Tagging has been shown to provide a mechanism for developing group norms and a shared vocabulary among learners (Yew et al, 2006). SLoog is a tagging website for areas in SL. The Salamander Project uses SLoog to collect tagging data on educational areas of significance in SL, and exports the peer-reviewed sites to MERLOT.

SIGs. Many professional organizations, including AECT, AERA, and Sloan-C, are forming special interest groups to support educators and researchers working in SL and/or virtual worlds. These SIGs provide a formal organizational structure by which the educator's work is given credibility and a space for discussion and presentations at conferences.

Photo & Video Sharing. Communication not only occurs through text and voice, but also through visual imagery. YouTube™, Flicker™, and Photobucket™ all have collections of pictures and videos about SL, many of them are educational. Videos created in the virtual world are known as "machinima," and are quickly gaining popularity as a new media form. Students can create their own annotated photo albums or machinima as a way to share their developing understandings with others.

5. Designing virtual world social networking opportunities

Learner interactivity must be purposefully designed into online learning (Berge, 1999; Chou, 2003). Gloor et al. (2006) recommends that instructors assist students by introducing communication mechanisms to support collaborative work at a distance, alleviating the need to figure it out on their own, and thus use time more efficiently to focus on class projects. While membership in of a variety of networks supports immersion in the virtual world (Bartle, 2004), thereby promoting persistence in learning, students can quickly become burned-out by participating in too many network activities simultaneously. So how does an instructor new to virtual worlds get started with SNKC?

First, instructors should become familiar with social networks in and around virtual worlds. Some of those are listed in this article. Second, consider the goals and objectives of your course or lesson. Introduce your students to subject-appropriate social networking sites. Pace that introduction and the required level of participation by considering the students' experience with 1) the virtual world itself, and 2) the current and desired level of engagement in a particular social network. In the table below, a matrix is provided to help guide instructors with the introduction and use of social networks in SL.

Table 1	**Matrix for Designing SNKC**		
	New to Virtual Worlds	**Some Experience with Virtual Worlds**	**Experienced with Virtual Worlds**
Social Network Engagement Level			
1. Identify networks	Provide single entry portal to virtual world (through a web page or wiki).	Introduction to inworld small group networks; create a group for specific course members.	Identification and inclusion of multiple in and out of world networks.
2. Lurk	Enter, observe, and learn the culture and norms of the environment, as well as the tools provided.	Begin participation in inworld small group networks (attend a building class, hear a lecture); lurk on relevant listservs.	Encourage visitation to networks used by others related to course.
3. Contribute	Begin interactions with others. Help other learners when possible.	Assist those hosting inworld events with marketing, traffic coordination.	Require contributions to multiple social networks, both inworld and out-of-world.
4. Create	Build something inworld…a book, an object giver, a simple car.	Participate in a group build, such as an exhibit or build out a place for yourself.	Design your own network around a given topic, or build out a place for others.
5. Lead	Establish a special interest group of like-minded peers on relevant topics.	Create an inworld group on a special interest topic.	Leverage partnerships among multiple group members to promote new knowledge development and

	learning opportunities.

Provide learners opportunities to work as *identifiers*, *lurkers*, *participants*, *creators*, and *leaders* in social networks, depending on their comfort and experience level. Even experienced users of social networks can be intimated to share their developing understandings of virtual worlds.

- *Identify* (What's out there?): At this stage, the instructor and/or students begin identifying relevant social networks that support intended course purposes and objectives.

  SNKC example: "Locate two inworld social network communication mechanisms related to SL that we can use to support our learning during the course. Post an annotated description of each resource on our class wiki."

- *Lurk* (What do we do here?): Lurking is a term used to describe the passive activity of reading contributions to social networks. This is commonly done when a user is new to an online community. While in the lurking phase, instructors can encourage students to identify the norms and purposes of a particular social network, and brainstorm how the class participants might use that network to support their own learning.

SNKC example: "Join the SLED listserv and read all postings this week. Identify the purpose of the list, and brainstorm a list of ways we might use it to accomplish our class objectives in the next two weeks. Post your brainstorm on our class discussion site."

- *Contribute* (What knowledge can I offer?): Students begin their participation in an identified social network. Typically, this might begin with a short introduction and question posed by the author. As users gain more experience (and thus credibility) in the network, they can begin sharing their own work to stimulate discussion and critical thinking.

SNKC example: "Over the next 5 weeks, make a minimum of 5 contributions of SL resources, teaching techniques, etc. to a social networking site supporting SL (inworld or out-of-world)."

SNKC example: "Write a minimum of a 150 word synthesis, discussing connections between theory and practice, the readings, and your own teaching context, and post to a blog of your choice. Post your blog URL in our discussion forum."

SNKC example: "Use the Salamander HUD to tag 5 educational locations in SL this week. Post your five locations to our discussion forum."

- *Create* (What knowledge can I construct?): At this stage, we move from knowledge generation to knowledge construction. Knowledge becomes physically manifested in building—whether building an exhibit, a physical space for learning, or a new social networking group, for example.

SNKC example: "Pose and answer a question that you have related to tools and educational resources in Second Life. Create a slideshow showing your question and at least four answers to that question. Import the slideshow and place it on exhibit in our learning center."

SNKC example: "Write one challenge and solution to a problem related to teaching in SL. Submit two paragraphs to the instructor. These will be compiled in a paper and submitted to the SLED listserv for comments."

- *Lead* (How can I lead others in the community?): Leadership opportunities abound in virtual worlds. Students can use current social networks to create partnerships and projects, build membership, or develop new networks using existing inworld and out-of-world communication mechanisms.

SNKC example: "We have been invited to present and discuss our work on *10 Challenges & Solutions to Teaching in Second Life* at an NMC Teacher's Buzz session next week. Prepare any supporting slides you might need for your portion of the presentation."

SNKC example: "Working in pairs, choose a topic of interest related to our course. Put out a call for presentations on this topic, and organize a panel of four presenters to share their work inworld. You are responsible for all event planning, marketing, and coordination."

6. Conclusion

While students eagerly use many social networks and virtual world environments for social communication and entertainment purposes, we see faculty struggle with adoption of these tools to enhance learning. Attention must be given to appropriate faculty training, not only in how to use the technology itself, but how to integrate it effectively into the curriculum in a progressive fashion.

There are also various technical and potential legal issues that can arise when integrating virtual worlds at the course, program, or university level, and these should be explicitly addressed. Bandwidth problems can occur when virtual worlds are used in a large computer lab, for example. IT has to spend time testing capacity for running multiple

virtual environments in real-time. University firewalls can also prevent access to some virtual worlds.

A recent series of articles in the Chronicle of Higher Education outlined potential legal issues universities might encounter by requiring students to participate in virtual world environments where they can potentially be harassed, abused, or encounter offensive adult material. Some universities are overcoming these issues with "Community Standards" that outline expected rules for participation, and provide directions on how to handle harassment, as well as offer disclaimers on the nature of content students may potentially encounter.

In summary, the opportunities made available by supporting social network knowledge construction in and around virtual worlds have amazing potential to help faculty teach, and students learn, in dynamic new modes. By understanding and familiarizing oneself with the available social networks and communication mechanisms associated with virtual worlds, and providing instructor training on technology use and integration strategies, faculty and students are provided a powerful base for exploring this evolving realm of complex social learning.

References

Bartle, R. (2004), *Designing Virtual Worlds,* New Riders Publishing, Berkeley, CA.

Berge, Z. (1999), "Interaction in post-secondary web-based learning*", Educational Technology*, Vol. 41, No. 1, pp. 5–11.

Castronova, E. (2001), "Virtual worlds: A first-hand account of market and society on the cyberian frontier", CESifo Working Paper Series No. 618, available at: http://ssrn.com/abstract=294828 (accessed 12 December 2007).

Chou, C. (2003), "Interactivity and interactive functions in web-based learning systems: a technical framework for designers", *British Journal of Technology,* Vol. 34, No. 3, pp. 265–279.

Dawley, L. (2007), "Persistent social learning: An emergent ID model for virtual world design", webinar available at: https://admin.acrobat.com/_a768376479/p17101188/ (accessed 12 December 2007).

Gloor, P., Paasivaara, M. Schoder, D. & Willems, P. (2006), "Correlating performance with social network structure through teaching social network analysis", available at: http://www.ickn.org/documents/COIN_courseProVe_sub.pdf (accessed 23 February 2008).

Haase, A. Q., Wellman, B., Witte, J., & Hampton, K. (2002),

"Capitalizing on the internet: Social contact, civic engagement, and sense of community", in Wellman, B. & Haythronthwaite, C. (Eds.), *The Internet and Everyday Life,* Blackwell, Oxford, UK.

KZero Research. (2007), "Metaverse growth forecasts", available at http://www.kzero.co.uk/blog/?page_id=1312 (accessed 15 April 2008).

Kuhn, T. (1962), *The Structure of Scientific Revolutions.* 1st. ed., University of Chicago Press, Chicago.

Lenhart, A., Madden, M., Macgill A.R. & Smith, A. (2007), "Teens and social media: The use of social media gains a greater foothold in teen life as they embrace the conversational nature of interactive online media", available at http://pewinternet.org/PPF/r/230/report_display.asp (accessed 28 March 2008).

Madden, A. (2007), "Social networking websites and teens: An overview", Pew Internet project data memo available at: http://pewinternet.org/PPF/r/198/report_display.asp (accessed March 10, 2008).

Papert, S. (1991), "Situating constructionism", in Harel, I. & Papert, S. (Eds)., *Constructionism*, Ablex Publishing, New Jersey, pp. 518.

Pink, D. (2005), *A Whole New Mind: Why Right-Brainers Will Rule the Future*", Riverhead Books, New York.

Rainee, L. (2008). "Video sharing websites", Pew Internet project data memo available at: http://pewinternet.org/PPF/r/232/report_display.asp (accessed 10 April 2008).

Yew, J., Gibson F. & Teasley, S. (2006), "Learning by tagging: The role of social tagging in group knowledge formation", *Journal of Online Learning and Teaching*, Vol. 2, No. 4, pp. 275.