

The Dharma Drum Buddhist College eLearning Beacon in Second Life

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Introduction

Innovative digital research platforms based on the World-Wide Web have revolutionized aspects of Buddhist studies. In coming years, advances in online virtual worlds will spark yet another revolution, blurring the distinctions between archives and classrooms and erasing the boundaries between digital and social environments. Virtual worlds will make possible a new paradigm for research and education, integrating existing digital archives with futuristic technologies, making possible new ways to find and present information.

In a virtual world, there need not be any difference between a database and a campus: the data itself can be the infrastructure of the university, and students from around the world can meet together with their colleagues and teachers to attend classes held within

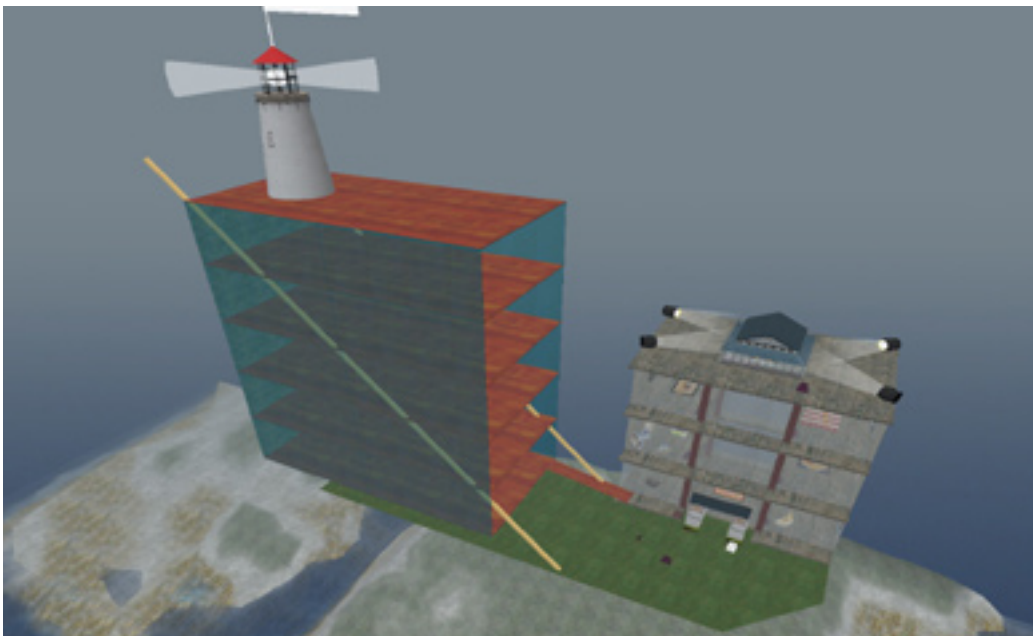


Figure 1: The eLearning Beacon in Second Life

a digital archive. For the teaching of the Buddhist canonical languages, virtual worlds will empower students who previously lacked the opportunity to learn. For researchers in Buddhist studies, virtual worlds will provide single access points not only to information but also to spontaneous conference venues wherein colleagues may meet together across international boundaries to discuss their findings and present their theses.

One such world already exists. Second Life is an experimental venue providing a virtual environment in which embodied residents (called avatars) meet together to interact in numerous ways. Over a million people visit this world each month. More than one hundred colleges and universities have campuses and hold classes in Second Life. Untold numbers of corporations conduct conferences and international training seminars within its virtual spaces. In the world of eLearning there is no more exciting and flexible platform for the convergence of technology and education. Therefore, to integrate the latest in digital educational methodologies with the field of Buddhist Studies, I have built and developed the Dharma Drum Buddhist College eLearning Beacon in Second Life.

The eLearning Beacon in Second Life

Linden Labs, creators of Second Life, maintains an interconnected grid consisting of over 5000 computers. The many regions of Second Life are hosted on dual-core dual-cpu Linux servers. Each server hosts several regions (called “sims”), of which there are over 22,000. Each region has a virtual area of 65,536 square meters (256x256m). The Dharma Drum Buddhist College eLearning Beacon is built on 7040 square meters of virtual land in a central region of Second Life called Catocala (see Figure 2). Our eLearning facility



floats in the air 100 meters above this land to ensure privacy.¹

Currently, the campus consists of three facilities: (1) a three-story classroom building; (2) a five-story museum building housing an interactive exhibit of Buddhist history; (3) an experimental language classroom employing innovative Tibetan language software developed by our language specialists. In

Figure 2: Mapped Beacon in Catocala. In addition to these facilities, at ground level there is a pleasant expanse of arborial waterfront to serve as a campus quadrangle.

1 The public is invited to visit the Dharma Drum Buddhist College eLearning Beacon in Second Life at Catocala (178, 65, 100) or view snapshots of Dharma Drum Mountain in Second Life at www.ddbc.edu.tw/en/about_the_college/second_life.html.

Virtual worlds encourage the imagination, nourish the creative process, and inspire innovation. Second Life possesses these unquantifiable characteristics, but it is also a highly technologized educational and social platform, supporting a wide variety of digital and communicative functions. The following chart lists the educational and social capabilities of Second Life. A single asterisk (*) indicates that Second Life provides this function at lower cost than common tools and facilities. A double asterisk (**) indicates that this capability is unique to Second Life (or similar Virtual World).

EDUCATIONAL AND SOCIAL CAPABILITIES OF SECOND LIFE	
<p>Activity Centers</p> <ul style="list-style-type: none"> • Art studio* • Community-building* • Conference center* • Experiment modeling* • LSL programming environment** • Language-learning facility* • Meeting space* • Project design modeling* • Virtual office hours** • Seminar classroom* • Socialization and recreation areas* • Visualization studio** <p>Communications</p> <ul style="list-style-type: none"> • Email client • Instant messaging and peer-to-peer text communicator • International voice communication system* 	<p>Information Management</p> <ul style="list-style-type: none"> • Database retrieval system • Powerpoint presentation display* • RSS-feed receiver <p>Multimedia</p> <ul style="list-style-type: none"> • Machinima production studio* • Movie theater • Streaming and static audio and video player. • Web browser <p>Project Resources</p> <ul style="list-style-type: none"> • Construction facility** • Holodeck** • Library* • Museum* • Project Poster and Demo center* • Student projects laboratory* • Student projects display center* • Remote connection to Moodle learning-management system** • Slide projector*

Static and Streaming Media in Second Life

Second Life supports both static and streaming media. Although the difference between these types of media is not always obvious, in general streaming media are housed on internet servers and brought into Second Life for viewing or listening (as in the case of video and audio broadcasts), whereas static media are preloaded locally into some type



Figure 3: Streaming webcam face.

of mediatron.² Static media that can be used in Second Life for educational purposes include web pages, photographs, tables, charts, databases, powerpoint presentations, and other types of visually-displayed information. Short audio files can also be housed in Second Life and therefore can be classed as static media. As we shall see, the eLearning Beacon employs both static and streaming media in innovative ways for educational purposes.

Streaming media can be brought into Second Life from private or public servers anywhere on the internet. The primary streaming media modes in Second Life are audio, video, and web-content. Media can be streamed from anywhere on the internet or live from a web-camera or other type of audio/video source. A parcel can accommodate one stream at any given moment, but parcels can be subdivided to give different campus areas access to different media streams.

A playful feature of Second Life is that streaming media (and static media, for that matter) can be displayed on any object. This leads to interesting effects. All surfaces of a classroom can be used to show a single video. A web-page can be displayed on a tea cup. An avatar can stroll about wearing its owner's face streamed from a web-camera, thereby imparting a weird aspect to the half-human half-robot avatar (see figure 3).

The ability to display web pages in Second Life is a recent and important development. It gives the eLearning Beacon access to all digital archives available on the World-wide Web. Students and instructors can consult CBETA, the Tibetan-Himalayan Digital Library, and other repositories of digital Buddhist studies. Private databases can also be queried.

2 I have borrowed the word 'mediatron' from the science-fiction writer Neal Stevenson (who also coined the term 'metaverse'). A mediatron displays media.

Not only web pages, but also slide shows, powerpoint presentations, and internet-based videos can be displayed on surfaces in the classrooms. Video tutorials are an especially convenient and effective educational tool in Second Life, where they are easily produced for classroom use and distribution. Machinima videos (as these computer-made videos are called) are screen-capture sequences originally developed by gamers to memorialize their favorite games. They have evolved to become a convenient and effective form of instructional media. Teachers can prepare short machinima tutorials for classes, or they can capture the classes themselves as machinima. Editing machinima is a relatively simple task. Final products can be uploaded to www.youtube.com (or many other sites dedicated to amateur video), and then streamed back into Second Life for educational purposes. We will discuss machinima below in the context of my Future Tibetan language program.

Streaming media includes RSS feeds. RSS feeds are popular on the World-Wide Web as a way to organize daily news contents without having to visit many different sites. In Second Life, RSS audio feeds can be synchronized with static media presentations. This means that, for instance, audio presentations from the Hopkins Tibetan Treasures Multimedia Archive can be brought into the classroom in conjunction with the texts on which these teachings are based.

In addition to providing classroom functionality and access to digital archives, the Dharma Drum eLearning Beacon in Second Life hosts an educational museum housing interactive exhibits depicting the life of the Buddha and the spread of Buddhism throughout Asia. The museum will also contain a regularly updated registry of digital Buddhism in Second Life, and so will act as a clearing-house for those who wish to visit Buddhist sites in Second Life.

Designed to facilitate both classroom-style education and self-learning, the eLearning Beacon will eventually provide numerous educational and research services; but its first mission is to enable students from around the world to study and practice the Buddhist canonical languages. Let us now look at the Beacon's innovative facility for the Tibetan language, which includes unique capabilities developed for the Beacon that, in time, might revolutionize the way languages are taught in virtual worlds.

Future Tibetan in Second Life

Future Tibetan in Second Life promotes language learning with both streaming and static media. Streaming media includes sound presentations from the Hopkins Tibetan Treasures Multimedia Archive, RSS feeds distilled from those archives, and machinima

tutorials produced for language-training. Static media at the eLearning Beacon is uniquely innovative. In the next section I will discuss a type of static media device that I have created which I call the Mediatron.

Mediatrons

A Mediatron is a non-human animated appliance programmed to deliver language instruction content. Mediatrons can contain any or all of the above-mentioned types of static media as well as computer programs.³ Research suggests that Mediatrons may constitute a particularly effective tool for optimizing learning; for example, according to Livingstone and Kemp, “. . . an animated agent programmed to deliver instructions

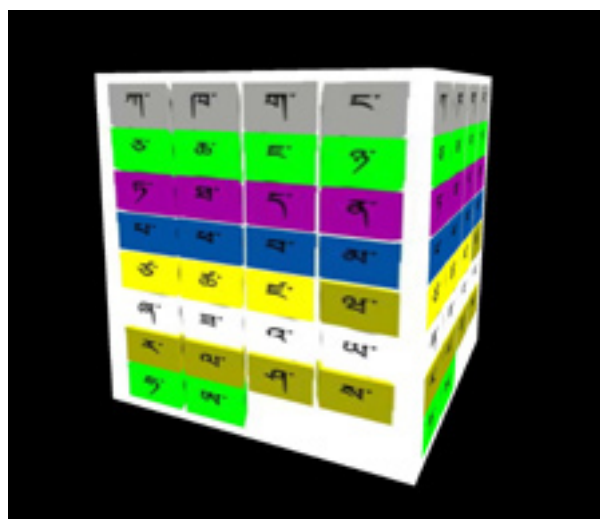


Figure 4: The Cube of Tibetan Consonants

actually helps optimize learning from examples.”⁴

Future Tibetan in Second Life includes a variety of these animated agents. Its Mediatrons are designed to be used either alone or with an instructor in a blended-learning situation (see below for a discussion of blended learning). So far, I have created four different Mediatrons:

- the Cube of Consonants
- the Wall of WylieWriters

- the WylieShouter
- the Screen of Sanskrit Sandhi

The Cube of Consonants (see Figure 4) presents students with options enabling them to become familiar with the shape and sounds of the Tibetan consonants. The Cube contains digitized static media textures of the thirty consonants and their sounds. Activated by user commands, it offers options for viewing, hearing, and reviewing the consonants and the Wylie transliteration scheme used for representing them in romanized characters.

3 The ability to create and program objects differentiates Second Life from most other virtual worlds. Objects in Second Life can be animated, manipulated, transformed, and controlled in an endless variety of ways with the LSL scripting language, a sophisticated event-driven programming environment designed by Linden Labs.

4 Livingstone and Kemp, 14. <http://www.simteach.com/SLCC06/> (accessed May 30, 2008). Archived at <http://www.webcitation.org/5YDJjWg7..>

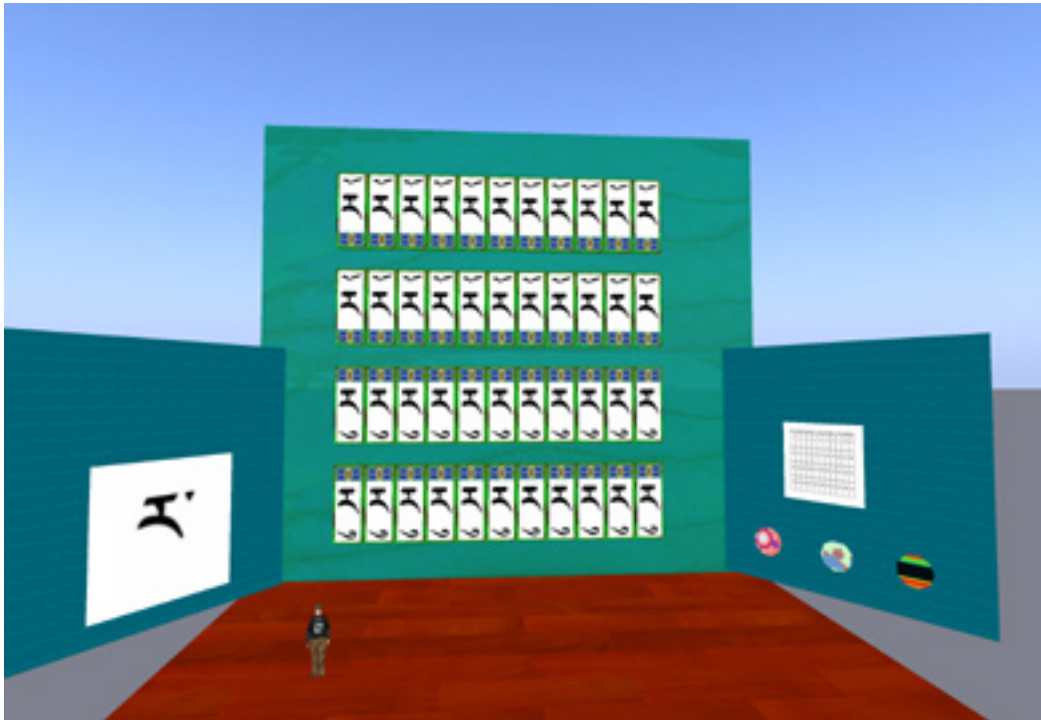


Figure 5: A Wall of WylieWriters

The Cube includes a proficiency-evaluation module allowing students to keep track their progress (visit my web page for a tutorial machinima video of the Cube of Tibetan Consonants: <http://magee.ddbc.edu.tw>).

The Wall of WylieWriters (see Figure 5) is the first method developed for students and teachers of the Tibetan language to write Tibetan characters in Second Life. Tibetan characters present a challenge for Second Life educators for two reasons: (1) there is no built-in way in Second Life to communicate with non-roman characters and (2) even a wall composed of Cubes of Tibetan Consonants would not be able to represent more than a limited subset of Tibetan words. This is because Tibetan words employ complex stacked ligatures. The Wall of WylieWriters overcomes these two problems.

It is not difficult for a Tibetanist to use the Wall of WylieWriters. The set-up program automatically creates an array of 44 WylieWriter panels. There is no limit to the number of WylieWriter panels that can be deployed, but 44 is sufficient for most lessons. Each WylieWriter is composed of three sections, allowing central consonant stacks to be superscripted or subscripted by vowels. The WylieWriters listen for commands on their individual channels. Users write to the WylieWriters using the standard method for transliterating Tibetan in roman characters, called the “Wylie Transliteration System.”

When a WylieWriter receives a command it parses the Wylie string and sends vowel information to the appropriate panel section, thereby displaying the appropriate vowel. Then it sends the remaining information about the central consonant ligature to the central section for display. The result is a Tibetan ligature.

Because it is time-consuming to write directly to a Wall of WylieWriters, I have also developed Mediatrons that can be preprogrammed and deployed with simple commands to write to an entire Wall simultaneously (or to erase it all at once). I call these objects WylieShouters (due to the “llShout” programming function that enables them to communicate with the entire Wall). WylieShouters complement a Wall of WylieWriters by giving teachers the opportunity to plan lessons and prepare them in advance. A Wall of WylieWriters and a set of WylieShouters comprises an innovative teaching tool enabling fully-functional Tibetan language classrooms in Second Life.

These Mediatrons are currently filled with Tibetan language textures and sounds. However, in the future I intend to use these same objects with modified scripts and different sounds and textures for the teaching of Chinese, Sanskrit, and Pāli languages in Second Life. I have already developed a Mediatron for teaching the major rules for Sanskrit word combination. There is no practical limit to how Mediatrons can be used. Since they are free and open for modification by others, I hope that someday they will be in use all over Second Life teaching numerous languages. The basic idea of a WylieShouter might even be backwards adaptable for use in a Real World classroom, since WylieShouters obviate the need for writing long strings of text on a computerized whiteboard, while still enabling spontaneous expression.

The Cube and the Wall are just two examples of the Mediatrons that I am developing for the eLearning Beacon. Other Mediatrons (including the eLearning Museum itself) are in the development phase. In general, Mediatrons are designed for self-learning but they also function in a teacher-controlled virtual classroom environment. As we will see, the optimal situation for learning in a virtual world is a blended environment wherein students can meet with teachers and also have opportunities to study individually. All Mediatrons are designed to facilitate a blended-learning environment.

Although no formal studies have yet been done to determine the benefits of creating language programs in Second Life with Mediatrons, preliminary tests suggest four general categories of pedagogical advantage:

- **Ease of implementation.** Creating language lessons with Mediatrons requires no specialized equipment and only basic Second Life scripting ability. Textures in

the JPG format and sound files in the WAV format can be created with standard software.

- **Situational flexibility.** With Mediatrons, one has the ability to tailor lessons to fit student needs. This means that the sounds and programs of any Mediatron can be modified to provide lessons at a variety of proficiency levels or for several different dialects. This broad linguistic applicability means that students at varying levels of proficiency and with varying research interests can work within the same curriculum. Even more remarkably, a single language program such as Future Tibetan in Second Life (the elements of which are freely copyable and modifiable) can easily be adapted to teach other languages.
- **Participant control.** Animated agents can be customized by the learner, allowing students to determine the time, frequency, duration, and content of learning. This flexibility offers a distinct pedagogical benefit, as studies have shown student control of content to be one of the eight necessary conditions for the acquisition of language.⁵
- **Project-based testing metrics.** Proficiency measurement can be built into each Mediatron.

Machinima

The machinima video tutorial is an important aspect of the Future Tibetan digital language program. Machinima video tutorials are inexpensive and relatively easy to produce using screen-capture and video-editing software. As with animation, virtually anything can be staged and recorded within Second Life. Once recorded, machinima can be incorporated into classroom structures. My Future Tibetan machinima tutorials demonstrate the usefulness of this medium in two ways: (1) they combine broad overviews of the content of Future Tibetan with specific directions for using Mediatrons and (2) they deliver classroom lessons. Watching machinima in these ways is useful for language learning, but machinima can be used in active as well as passive modes. Students can be given machinima production assignments as language-learning projects: for instance, students can collaborate in Second Life to produce a dialogue. The resultant machinima recording can be uploaded to the internet and incorporated into later syllabi. This approach engenders interest and enthusiasm and enhances the learning experience.

Future Tibetan in Second Life has numerous innovative features: it is freely distributable, inexpensive to create, and easy to modify. Thanks to the many ways in which Mediatrons and machinima convey information in Second Life, the program is self-explanatory.

5 R. Ellis, *Understanding Second Language Acquisition* (London: Oxford University Press, 1985), 161.

Since Future Tibetan makes use of media recordings of native speakers, it is authentic. Moreover, the program fulfills the ancillary goals of distance-learning by helping students overcome problems of access, economics, and timing. It serves the needs of a diverse population by being flexible in terms of immersion, interaction, and extensibility.

A Connectivist Approach

The combination of ever-changing sources of information together with the ability to accommodate multiple learning styles makes Second Life a radically new learning environment. A new learning environment calls for an innovative learning methodology. George Siemens has developed his now theory of “Connectivism” in response to this new environment. He enumerates eight principals of a connectivist learning methodology:⁶

- learning and knowledge rests in diversity of opinions;
- learning is a process of connecting specialized nodes or information sources;
- learning may reside in non-human appliances;
- capacity to know more is more critical than what is currently known;
- nurturing and maintaining connections is needed to facilitate continual learning;
- ability to see connections between fields, ideas, and concepts is a core skill;
- currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities;
- decision-making is itself a learning process (choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality).

Thanks to its innovative design, the eLearning Beacon naturally encourages a connectivist approach to education in a virtual world. It encourages a connectivist methodology for language learning in part by accommodating multiple learning styles, connecting nodes of information employing non-human appliances, emphasizing self-learning explorations, and nurturing and maintaining connections between the student and the most current sources of information in Buddhist studies research.

A Blended Learning Component

Future Tibetan in Second Life has an inherent limitation: like other digital learning language programs that rely on non-human instruction, its teaching style is interactive but

6 George Siemens, “Connectivism: a Learning Theory for the Digital Age”. <http://www.elearnspace.org/Articles/connectivism.htm>. Created 2004; accessed December 22, 2007. Archived at <http://www.webcitation.org/5WUCm9EkU>.

non-experiential. In order to provide the crucial experiential element, distance learning specialists recommend a blended learning solution.

A blended learning approach begins with a well-designed digital learning program and adds a human instructor to the educational mixture. Human instructors can be blended into the digital environment either in a virtual world—as in the case of a Second Life classroom—or in cooperation with a computer program in an actual classroom. Gonzales describes the blended approach in this way:⁷

Academic institutions ... have progressively been adopting new methods through the use of distance learning solutions. Organizations facing massive technological changes have also had to rethink methods of delivering training. An effective option is found in blended learning programs that deliver e-learning and instructor-led training. Many academic areas are discovering this to be a good solution also to traditional college teaching. With a blended learning approach, an organization utilizes e-learning and instructor-led training to address the diverse learning needs of all its trainees on a 24/7 basis.

Gonzales also explains the advantages of mixing eLearning with classroom learning and points out how a blended approach can be more engaging and interactive. Gonzales speaks to the effectiveness of digital programs and the experiential aspects of face-to-face learning environments. Blending the two means that high-cost, fixed-schedule classroom environments can focus on higher levels of skill acquisition and knowledge transfer.

The ability of blended learning to add an experiential component is important for distance-learning instruction in the Buddhist canonical languages, for they are all less commonly taught than European languages. Native speakers who can teach Tibetan are indeed difficult to find; but by using a virtual classroom in Second Life, a single native speaker can provide authentic experiential language-learning opportunities to numerous students in different venues. Students from all parts of the world can meet in Second Life to interact visually and use voice-chat to speak with a native speaker in a virtual classroom. Second Life virtual classrooms offer the same type of distance learning opportunities as video conferencing, but with far more opportunities for experiential interaction and immersion. Through this functionality, Second Life can emulate the many learning opportunities of a real-world classroom within a distance-learning situation,

7 Cathy Gonzalez, “*The Role of Blended Learning in the World of Technology*” <http://www.unt.edu/benchmarks/archives/2004/september04/eis.htm>. Created 2004; accessed December 20, 2007.

imparting the benefits of both. Student evaluations can be conducted through testing and observation, as in a physical classroom.

Advantages of 3D Worlds Over 2D Learning-Management Systems

Second Life is a relatively new technology and does not yet have the market penetration of its two-dimensional Web-based cousins (for instance, the learning management systems Blackboard and Moodle). Since educators and students must face a learning curve (and perhaps an equipment upgrade as well) in order to access Second Life, the following question should be answered: “What does the three-dimensional world of Second Life bring to the field of language acquisition that is lacking in the more familiar two-dimensional platforms?”

Studies suggest three areas in which virtual worlds prove superior to these platforms in terms of distance learning:

1. A social dimension for distance learning. Educational researchers posit the importance of mutual interaction as a spur to learning: as Bronack, Riedl, and Tashner note, “Learning occurs first on the social level and next on the individual one” and “the development of community in online settings is critical to the success of distance learning”.⁸ Virtual worlds such as Second Life provide the basis for a community of learners to come together in the learning process, whereas Web-based distance learning systems do not.

Educators familiar with virtual worlds also perceive the importance of activity groups in the learning environment. The benefit of these virtual worlds, as Barab et al. suggest, is that they function “less like books, films, journals, and broadcasts, and more like laboratories, workshops, offices, and studios, in which students immerse themselves within contexts that challenge and extend their understanding.”⁹

Second Life offers social opportunities between participants, flexibility of learning design, and laboratory-like contexts that Web-based programs cannot achieve. Since Second Life allows for human interaction with students, distance learning instructors can blend themselves into digital programs in ways that we have only just begun to explore.

8 S. Bronack, R. Riedl, and J. Tashner, “Learning in the Zone: A Social Constructivist Framework for Distance Education in a 3-dimensional Virtual World. *Interactive Learning Environments* (14:3, 2006), 219-232.

9 S. Barab, K. Hay, M. Barnett, and K. Squire. “Constructing Virtual Worlds: Tracing the Historical Development of Learner Practices.” *Cognition and Instruction* (19:1, 2001), 50.

2. A sense of embodiment. Second Life equips users with a customizable persona or “avatar.” The avatar embodies the user inside the virtual world, helping to provide a sense of being “there.” Studies have determined that this sense of embodiment facilitates collaborations, imbues students with a sense of community, and enhances experiential learning.¹⁰

3. Superior demonstration modeling. Two-dimensional learning management systems cannot compete with Second Life in terms of demonstration. Livingstone and Kemp make this point:¹¹

Rich 3D demonstration models can be built in SL [Second Life]—leveraging the power of modern computers to allow students to experience phenomena of interest. The acknowledged power of multi-media to improve delivery of material over purely written means . . . is worth exploiting—and SL makes this quite feasible, even for faculty with only modest scripting and modeling skills.

An example of the eLearning Beacon’s use of demonstration modeling is its museum facility. The museum floors are maps of the historical areas of Buddhist Asia. Walking across a map materializes the appropriate exhibit. Although the development of the museum is in an early stage, future versions will engage students with game-like three-dimensional modeling tasks to enrich the historical learning experience at every stage.

Conclusion

Currently, education in virtual worlds is the experimental practice of a relatively few forward-looking institutions and educators. Nevertheless, our world is entering a new paradigmatic phase. The life-styles of the previous century are being seen as increasingly impractical and counter-productive in today's world. It seems likely that distance-learning programs will continue to become more important to education as costs for attending local campus learning programs spiral. Moreover, the hardware and software powering virtual worlds is still in its infancy, yet already provides fascination and function for millions of game-players and hundreds (perhaps thousands?) of students and educators. Virtual worlds today are in the position of the World-Wide Web of the mid-90's. Just as Taiwan's Dharma Drum led the way then in the development of web-based Buddhist

10 Livingstone and Kemp, 14.

11 Livingstone and Kemp, 15.

digital resources, so also we are taking pioneering steps in the development of Buddhist virtual-world initiatives.

Virtual-world language learning in Buddhist studies will inevitably develop multiple digital learning systems, and Future Tibetan in Second Life is merely one possible model. However, Future Tibetan is already a practical solution because it offers levels of flexibility of use, extensibility of design, and participant control that many classroom-based programs cannot achieve. Moreover, it is proficiency-oriented, relatively simple to produce, inexpensive to implement, and freely distributable. With the addition of a blended learning solution to introduce the experiential element into the program, Future Tibetan in Second Life can enable students with no access to a Tibetan language classroom to make considerable progress towards their language learning goals.

As systems evolve and hardware improves, the DDBC eLearning Beacon in Second Life will become an increasingly important component of the College's educational profile. The Beacon promises an inexpensive and convenient venue for building and delivering effective distance language-learning programs, programs that will become increasingly popular and necessary. Luckily, there is no need to sacrifice pedagogical effectiveness for convenience. As I have attempted to demonstrate, Second Life offers both.

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