

# Curatorial Work and Learning in Virtual Environments: A Virtual World Project to Support the NDIIPP Community

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## ABSTRACT

The University of North Carolina at Chapel Hill and Virginia Tech (VPI&SU) are researching support of the digital preservation and curation community in Second Life (SL). We will explore how SL can be used, with a focus on education and dissemination. Our assessment will ascertain how serious use of immersive environments can yield benefit to scholarly communities. Our initial work is with four types of preservation/curation content. First, we hope to enlist InDP participants so their systems and results can become better known through SL. Second, we will support posters in SL as a way to share what is typically ephemeral knowledge about curation, digital libraries, and digital preservation. Third, we will help people learn about iRODS, using streaming video based on recordings made in Spring 2009. Fourth, we will develop ways to preserve what we collect and develop in SL. Beyond these content-based efforts, we will explore how preservation and curation can proceed, when split between two lives (Real Life and Second Life). Thus, we will explore activities, interactions, privacy concerns, and data transformation. It is hoped that our work will be of particular benefit to the National Digital Information Infrastructure and Preservation Program and digital curation communities, and to those exploring advanced use of SL.

## Categories and Subject Descriptors

H.5.1 Multimedia Information Systems—virtual realities, I.3.7 3-D Graphics and Realism—virtual reality, H.3.7 Digital Libraries

## General Terms

Algorithms, Design

## Keywords

Second Life, 3D, virtual world, digital preservation

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## 1. INTRODUCTION

### 1.1 Working in Second Life

The University of North Carolina at Chapel Hill and Virginia Polytechnic Institute and State University (Virginia Tech) received NSF funding on April 1, 2009 for exploratory research to demonstrate how **Second Life (SL)** [1] can be leveraged in the digital curation community for purposes of improving work practices and training. The general aim is to understand collaboration, related to digital curation and preservation, that builds upon innovative and serious use of virtual environments. Specific aims focus on developing and assessing SL services that support collaboration and training related to curating and preserving digital objects and collections. These services will be developed and studied in the context of, and with the assistance of, the **National Digital Information Infrastructure and Preservation Program (NDIIPP)** community. To this end, we envision active learning scenarios that are more like lab rotations in the sciences than the self-directed online tutorials that are used by students and professionals in various contexts.

### 1.2 Education and Dissemination

This work will provide a useful service to an important community, create and evaluate innovative collaborative tools for cyberspace work, and aid our understanding of how collaborative communities emerge and are sustained. The training program will support non-traditional technical students from the humanities, as well as students in computer, library, and information sciences. All resources that are produced over the course of the project will go into NSF's NSDL, and serve as a model for other SL-based content.

In particular, we will examine how SL can go beyond facilitating meetings at a distance, to enhance education and training, by incorporating community time and effort into the self-directed learning that is possible with Internet-based information resources.

### 1.3 Assessment

The value of social computing environments has been demonstrated in many contexts, including web search, shared bookmarking and photo sharing, personal social networking, online support groups, and information resources such as Wikipedia. Collaborative game environments have been used as both research environments to study collaboration and as environments for facilitating scientific meetings. Professional organizations and scientific communities leverage cyberinfrastructure and social network applications to share resources, collect data, and facilitate communication. Virtual worlds such as SL have been applied to support a diverse range of professional and work activities [2, 3], and educational practices [4]. Yet, so far there is little empirical evidence on how virtual worlds are adapted and leveraged to promote scientific progress.

To achieve project aims, we will create a support environment in SL (on our new island, Digital Preserve) for digital curators to facilitate large-scale data management and preservation work processes and communication; investigate whether and how archivists and curators adopt and work in SL; and collect or develop learning resources and social network-based support for students and practitioners studying curation and preservation topics. Our assessment will cover all of these activities. We will both cache and log usage (including visits, chats, comments, contributions, etc.). One key measure is the extent and success of education and dissemination related to our project.

## 2. PRESERVATION CONTENT

We will work with four distinct types/sources of content as we explore curation and preservation in SL.

### 2.1 InDP 2009

It is noteworthy with regard to our project and InDP (Innovation in Digital Preservation) that our initial funding is for a year, and requires rapid engagement with the digital preservation community. Hence, we aim to involve InDP attendees in our project, and offer our assistance to help make their projects more successful, or at least to broaden their impact. Thus, we hope that all who attend InDP will allow us to provide space and assistance, so that they may offer lively interactive demonstrations of their approach at the Digital Preserve. Alternatively, we will be happy to work with any of various types of “canned” or semi-canned versions provided, including posters.

A key point of our discussion at the workshop will be how to best present, illustrate and demonstrate each of the key ideas related to digital curation and preservation, and how to do likewise with each of the methods and systems developed by those attending the workshop.

### 2.2 JCDL 2009 Posters

Just like demonstrations, posters are a key venue for scholarly presentations. Much of the value of posters comes during the discussion at poster sessions, which is inherently ephemeral and difficult to preserve. In fact, most posters themselves are not preserved. Although textual summaries might be contained in digital libraries of proceedings, the posters themselves often end up on departmental walls for relatively short periods of time and are then discarded. We have begun to investigate how some of the benefits that accrue from face-to-face poster sessions can be emulated and preserved in virtual worlds. Observing that posters at conferences are helpful for teaching, learning, and

reference, and noting that there usually is very little time when they are available for viewing, we developed a parcel on IEEE Island in SL [5], assigned to the IEEE Technical Committee on Digital Libraries (TCDL). This work, under the sponsorship of TCDL, involves working with the ACM/IEEE JCDL 2009 Poster Session chair and the poster presenters, so that all presenters who agree will have their posters shown not only in the poster hall (which we illustrate in Figure 1) for JCDL 2009 in Austin, Texas, but also in the SL TCDL building (Figure 2) [5]. We also will replicate this poster display in our Digital Preserve region, and will have an additional Poster Garden to explore two different approaches for the display of conference posters on SL, one more traditional, and one more artistic. We aim to preserve not only the poster images, but also related metadata, plus annotations and usage traces of poster viewings. We have learned that we must relate our preservation efforts with intellectual property rights issues and concerns. Further, there is the challenge of persistent links connecting the poster with the people involved, their other publications, the systems and equipment that enabled their research, and other related metadata and associated information.



Figure 1. Posters displayed in the TCDL building on the IEEE island in Second Life



Figure 2. The TCDL building under construction on the IEEE island in Second Life

We have given four demonstrations to-date of the poster site:

- February 17 to the Computing Resources Consortium for Virginia Tech's Department of Computer Science, sharing with a number of visiting companies;
- March 16 to Virginia Tech's class on Introduction to Living In the KnowlEdge Society (LIKES);

- April 3 to a team organized by Leslie Jarmon of University of Texas at Austin, also including Ohio Univ. and Caltech;
- April 29 to Virginia Tech's class EDCI5564.

Visitors to the TCDL building have shown interest in viewing posters this way, especially when there is a possibility of engaging in synchronous discussion with the author. Further study is required regarding how poster viewers get questions answered when the researcher (poster author) is not at hand. We can devise mechanisms for leaving notes that will go to poster authors, but it is not clear how close we can come to the benefits of synchronous interaction. One hope is to have volunteer guides/mentors who will stand by to assist others, and will pass along what they were taught by the poster authors. Another is to have scheduled discussions with poster authors; we will further explore recording these synchronous sessions on video.

Within this initial study on posters, we have faced challenges. We experimented to determine the best format for accepting posters, as there is no standard practice or procedure. We had to determine, as well, how to scale posters both in terms of pixels and in SL metric dimensions for optimal reading and placement within our facilities. At the same time, we had to deal with rights management, asking each author for their permission to republish and preserve their works within the virtual world. Additionally, we aim to maintain links between our in-world posters and their Web-based counterparts. These challenges call for attention to be paid regarding curation, so all of these factors are properly fixed and remembered.

### 2.3 IRODS

As video becomes increasingly ubiquitous for learning and communication, we also will investigate ways to integrate video and make it more dynamic in virtual worlds. We recorded, over a complete semester, Prof. Reagan Moore and his team at UNC as he taught about creating iRODS rules [6]. iRODS is a framework for defining policies in data grids that grew out of the development and use of Storage Resource Broker preservation services. iRODS rules are a type of adaptive middleware that allows curators to define preservation policies in data grid and this course presents background and techniques for creating the rules. We will offer the videos for these sessions at the Digital Preserve, as streaming video shown on the screens of some of our buildings [7]. As the course is strongly practical and dependent on the use of the iRODS platform, there may be particular challenges faced by learners who just view the videos. We aim to show that the virtual interaction of the NDIIPP community members will make this material more valuable, as people who have experience with the iRODS platform will be in a better condition to explain to others the use of the system. We plan to investigate ways to support annotations and discussions around the videos and to use them as part of laboratory sessions where digital librarians and curators create rules for their own collections. As with the posters, we will also schedule events where the instructors for this course can answer questions from our visitors in synchronous mode, and record these sessions on video.

### 2.4 Preserving Second Life

In addition to our work to use SL to support the digital curation and preservation community, we also will research how preservation and archiving can take place as we develop in SL.

We aim to build on the 5S (Societies, Scenarios, Spaces, Structures, and Streams) framework [8] for digital libraries to allow formal description of preservation systems, as well as interactive sites, so what we build will be properly archived.

Since Linden Lab has provided an open source version [9] of one release of SL, we can experiment there as we seek to record all the defining information stored in SL. We want to ensure that if we move from SL to an even more functional virtual environment, we can ensure proper migration. Along the way, we seek to determine how to handle SL revisions, upgrades, and mergers.

SL is susceptible to malicious hacking attacks, just like what happens in normal internet space. SL land owners who are attacked by SL hackers called "Griefers" experience unwanted modifications in their own land, or even lose everything they made on the land. Currently there is no backup or recovery service provided by Linden Lab [1] (the creator of SL) in contrast with other web services in the internet. To explore the use and development of backup solutions for 3D virtual environment like SL and also to protect our own research assets built in SL, a simple and automated object backup solution will be studied and implemented. The current best solution is to record for an object (called a 'prim' in SL) its information, like location coordinates, shapes, etc, and then to save that along with the original object in another object designed specifically for backup purposes. Afterwards, one can use the information and the saved objects to re-populate (restore) them. Our research also can be used in digital preservation education as a good example of preserving objects in 3D virtual environments.

### 3. TWO LIVES

A unique aspect of our work is the fact that curation and preservation relate to objects, contexts, processes, and policies that have varying representations in SL and Real Life.

#### 3.1 Activities

Thus, we consider activities that are manifest in both lives. Now that we have paid for the Digital Preserve, we are planning and constructing facilities for preserving documents and for teaching. Some particular challenges along this process will be attempting to make our objects transferable across platforms and developing systems that allow us to track the activities of our island's visitors in a rich manner that allows for later analysis.

The largest challenge, though, will be attracting and motivating people to join and participate in this project in a sustainable fashion. Although SL is a rich platform for remote interaction and several forms of collaboration, it has a considerable learning curve for novices and requires up-to-date computers with high-end graphics processors for seamless participation.

We will devise strategies for creation of sustainable communities in this environment, and deliver materials required in order for these to flourish. In the Digital Preserve, we plan to have a cafe/bar where people can network, a lecture village where lectures will be provided in a more leisurely setting, as well as a welcome area designed to help newcomers. We hope to report on these at the InDP workshop and to demonstrate them so that attendees will become part of those communities.

## 3.2 Interactions

As shown in Figure 3, we are constructing an advanced meeting and learning theater with multiple slide displays and live video streaming in the TCDL building and in the Digital Preserve.



**Figure 3. Advanced meeting and learning facilities under construction in the TCDL building**

A good sense of co-presence is important when people interact with each other, especially in virtual environments like SL. This may greatly influence the usability of the services in it, or even the environment itself. Live video streaming [10] is a crucial way to provide means to interact between people in the real world and the virtual world.

Having a stronger sense of co-presence, and better usability, affect the overall quality of teaching and education in virtual environments like SL, whatever topics are covered. Therefore the use of advanced facilities like live video streaming and multiple displays with sophisticated controls will be implemented and tested in our research.

## 3.3 Privacy

SL provides land owners with the ability to sense avatar behaviors and the environment by writing and embedding proper scripts [11] into objects residing on their property. By expanding and utilizing this feature, it is possible to automatically observe and record users' (avatars') movements, and even what they say (using text chatting). This kind of capability is useful when collecting data about user behavior and responses, in the course of experimental studies carried out in SL.

To conduct user studies in SL, it also is necessary to get IRB approval and informed consent from each user. But the identity of users is hidden behind their avatars. Moreover, it is possible for users to create more than one account in SL. These and other concerns will be explored as we move forward with our assessment plans, guided by studies and policies developed by other groups interested in privacy [12].

## 3.4 Data

HTTP requests and XML-RPC can be used when developing SL services accessing data stored outside of the SL environment. So instead of storing all the data within the SL environment to provide web services like digital libraries, it is possible to access and utilize already existing data servers.

A process which converts data harvested from servers outside to SL friendly format (JPEG images) is necessary before populating the data within the SL environment. One example is the application of textures to SL objects which represent original analog or digital forms of the data that came from Real Life.

To explore the feasibility of archiving services within SL environment, the processes mentioned above will be implemented and tested.

## 4. CONCLUSIONS

The two main goals of our project (<http://ils.unc.edu/SLEC/>) are to: 1) create a support environment in SL to facilitate large-scale data management and preservation work processes and communication, and 2) investigate whether and how archivists and curators adopt and work in SL. Though our project is new, we have already launched a number of studies, given demonstrations, and engaged in work related to preservation in a number of contexts. We are exploring preservation of different types of content, as well as of activities and interactions, along with policies. We hope that InDP content will be included at our SL island, Digital Preserve, and that it will be a haven for teachers, students, and mentors helping spread the word about digital curation and preservation.

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