This article explores how Second Life (SL) can be used to organize and display collections of information objects, with an emphasis on describing the differences to information architecture for the World Wide Web (WWW). During an NSF-funded project focused on digital preservation, we explored the display and conservation of ephemeral academic information within an immersive environment such as SL. This article describes some of the findings related to information organization, presentation, navigation and orienteering, as well as some challenges for the management of online communities.

What Is Information Architecture?

*Information architecture*, as defined by the Information Architecture Institute ([www.iainstitute.org](http://www.iainstitute.org)) is

1. The structural design of shared information environments.
2. The art and science of organizing and labeling websites, intranets, online communities and software to support usability and findability.
3. An emerging community of practice focused on bringing principles of design and architecture to the digital landscape.

Information architects deal with the organization and presentation of information in digital spaces, creating navigation structures and defining metadata schemas to facilitate browsing and searching through collections of documents. Hyperlinks and conceptual hierarchies tie documents together in digital information architectures. The bulk of the development in this field has been in the context of the WWW.

In contrast to the WWW, virtual worlds are image-based, not text-based. Within the virtual worlds context, textual documents must be presented in the form of surrogates. In SL, text can be read in two formats: as notecards or as bitmaps.

A notecard is a text object that is not seen in the SL landscape, but is passed on from person to person. When someone gives you a notecard – or you find one in an object – you need to open it in order to read its contents. Once opened, notecards are displayed in a new window of your SL browser (Figure 1). When closed, notecards reside in people’s SL “inventories,” their virtual backpacks. These cards can only be searched by title once they are in an inventory.

The second way of displaying text is as bitmap images in the SL landscape. These images will be rendered as a texture on the surface of an object, and the SL engine will constantly rearrange it according to the perspective of the viewer.
This characteristic creates a huge difference from the web, where large collections of textual documents can be searched and navigated with ease.

**Teleporting, the Hyperlinks of SL**

Another important difference in the way SL works as compared to the WWW is how points are connected: While hyperlinks connect anchor words in documents, SL “teleports” link places in the virtual space, as defined by X, Y, Z dimensions.

As a result, navigation is not as fine grained as in the web. SL connects hubs, not particular objects or information pieces. When teleporting, the landing points are target locations where people arrive in order to start looking for the sought object as opposed to specific documents as in the web.

For instance, you might get an invitation to a lecture with a landmark (link) embedded in the card. You teleport, arriving at the central destination of the area where the class is taking place, and then start looking for the particular lecture hall or classroom. This search can involve navigating a series of buildings, floors and so forth. Likewise, when you are searching for products in stores, your keyword search will tell you what stores have the type of product you want, but you will only be able to teleport to the front door of the stores. To find a particular product, you will then need to start browsing the virtual store. SL stores are usually arranged in vertical displays and aisles, with products represented by either flat images or 3d samples (Figure 4). All of these spaces are navigated visually, and large stores have multiple floors. Although objects can have a text-based label floating on top of them, it is not possible to perform fine-
grained keyword searches for particular objects within the store’s space, so it is necessary to walk around the store in order to locate a desired item.

Spatial Locomotion

Moving through virtual worlds can require quite a learning curve for people who are not used to immersive games. They require a combination of skills for controlling the avatar and the camera. In Second Life, particularly, avatars may walk, run and fly, or teleport from one point to another. Added to the basic functions are a variety of user-created ladders and stairs, elevators and teleport portals. Walking, running and flying will involve adjusting to the virtual architecture of these spaces, circumventing walls, trees or other kinds of objects.

Unlike web-based architectures that are linked by hierarchies and navigation menus, SL spaces are arranged very much like in traditional architecture. They need to conform to the bodies of the people who will be visiting the spaces and provide visual cues to their navigation.

An interesting opportunity that SL presents is the possibility of shaping land. This power gives designers the option of creating visual landmarks that resemble natural landscapes. In our Digital Preserve Island, we’ve placed the orientation area atop a hill that sits in the center of the property, giving visitors a panoramic view of the island to help them guide their visit (Figure 5).

Displaying Conference Posters

One of our approaches to preserving academic ephemera has been the creation of conference poster exhibits that can be visited anytime. Although there have been some challenges presented by the limitations of text display described above, it has been a great opportunity to collect and preserve material that otherwise has a very short life. For some of these conferences we have organized events that run simultaneously with the physical conference. Some researchers from remote locations who have been unable to present their posters at such conference have been able to discuss them with our SL visitors. The following are among our collection of conference posters:

- JCDL 2009
- ECDL 2009
- ASIS&T 2009
- CHI 2010
- WWW 2010

We have explored the arrangement of these posters in two main styles. Some have been placed in specially created poster buildings (Figure 6), while others are laid out in the open, in a landscaped garden with trees, a pond and a river (Figure 7). In both cases, the navigation of the posters requires people to walk around the space where the posters are, much like in

FIGURE 5. Overview of the Digital Preserve from the Welcome Area

FIGURE 6. Exhibit at poster building during inauguration
real life. One interesting trick that we have developed to help visitors navigate through posters is the creation of a floating text label above them. Floating labels are possible to implement by hiding a script inside the poster object and can facilitate reading the title and the author’s name from a certain distance and from any angle (Figure 8). However, floating labels will tangle if they are too close together, and again, they are not searchable.

**Multimedia Integration**

SL has capability for the development of media-rich instances for interaction, including mediated lectures and classes, discussion meetings and movie theaters. Asynchronous presentation of media can also be embedded in the form of video and audio recordings, virtual books – where pages are screenshots of the original page – and virtual robots that have varying degrees of interaction and can provide some responses. All of these present a series of challenges that require learning SL’s scripting language in order to get full control beyond the basics. Video in particular has proven to be a complex format as it involves a series of software layers that make troubleshooting a challenge. Despite these limitations, in an interesting experiment, our team was able to produce live video streaming from the JCDL 2009 conference poster session into the virtual poster session for the same conference.

**Challenges for Community Management**

Oftentimes information architecture involves designing the infrastructure for the creation of online communities. Increasingly, the creation of content is in the hands of end users, and the designers create the spaces for activities. SL is a participative environment where people flock into groups determined by all sorts of interests, and their owners – end users – create most of the buildings and stores you visit in SL. However, the most important difference between online communities on the web and SL communities lies in the synchronous nature of SL.

Creating an SL community requires the presence of moderators and the rallying of participants until a group of regulars gets used to visiting a certain place at a certain time. It is also important to consider that SL is set up in a way that people from any part of the world can visit every region; therefore, time zones start playing a role in SL participation.

If you cannot staff your space 24/7 in order to greet newcomers and show them around, explaining the culture and atmosphere of your land, you can focus on creating regular events and inviting potentially interested participants. In fact, having lots of people in your land is likely to attract more people, while having it deserted will most likely inhibit curious passers-by.

Additionally, the synchronous focus of the SL experience is attention demanding: It requires people to be there with their full awareness for
considerable slots of time in order to make the experience valuable and allow conversations to flow. Multitasking on other software while engaged in a SL conversation is often noticed and is usually considered rude behavior. Traditional web communities have an advantage in being asynchronous, allowing people to participate in discrete time lapses that can be interrupted. This affordance lets people fit their participation much more easily into their daily time-flow.

The interface of SL requires a considerable learning period. People who are not SL users who visit our project for the first time feel frustrated for lack of control in the environment. This unease makes it very hard to create a community with newcomers to SL, as the learning curve and synchronicity of the platform pose a considerable barrier to entry. Most people will not make the effort to invest weeks getting familiar with SL and log on regularly unless they have a strong personal motivation (individual motivation, school or work assignments, or a group of friends). Because of this reality, we’ve focused our community-building effort toward people who are already SL users and participate in groups of related topics.

Implications for Designers

The current platform of Second Life poses a series of challenges to the design of information-rich spaces. This world is focused around real-time chat and visual objects; it does not natively accept textual documents. Our experience suggests focusing on shaping spaces that encourage social interaction, as this feature is what most attracts people to SL.

Kick starting communities in immersive worlds requires collaboration and invested effort, yet the maximum potential of this environment lies in the interpersonal conversations that can take place in its spaces. Textual documents should be kept to a minimum.

Information seeking is a challenging problem in this environment. Bold visual signs are critical for orienting the visitors to find things within 3D spaces. The creation of visual orientation guides can be worth the effort for spaces that hold collections of objects.

In terms of creating virtual worlds, one challenge will be incorporating support for collections of information rich objects. Newer generations of immersive environments will need to find support for richer metadata on objects, improved forms of text display and improved crawling of elements for spatial retrieval. At the same time they will face the problem of tracking conversations in forms that are plausible for later recollection by visitors.

Conclusions/Questions

Second Life is a highly visual environment where the traditional tactics of information architecture are not supported. Information objects become problems in this space.

Architecture for immersive worlds such as SL should focus on the creation of spaces that facilitate interpersonal interaction. Just like regular IA, immersive architecture should cater to the circumstances in which the spaces will be used, including the needs of the people. With the strong visual/cultural orientation of virtual worlds, the aesthetic style has a very strong relevance for the identification of visitors with their peers.

The synchronous nature of this format creates additional challenges for the creation and maintenance of communities, yet the rich sense of co-presence is the most powerful feature of virtual worlds, offering mediated interpersonal experiences that can be worth the effort.

Text in immersive worlds should be kept to a minimum as it is not the focus, and it brings a series of complications. Instead, 3D models and visual representations should be favored.

Open questions remain:
- How can the challenges of community building and audience attraction be minimized?
- Where is the threshold for the size of text being presented?
  - How can the objects be optimized for findability?
  - How can conversations be stored?

We hope to find answers to these questions in the future.

Acknowledgements

NSF Grant IIS-0910465 funds this project. I’d like to thank the rest of the team who worked on the creation of this island, especially Gary Marchionini at the University of North Carolina and Ed Fox at Virginia Tech and his students Spencer Lee, Uma Murthy, Elizabeth Lowry, Bradley Willis, Joseph Bourne and Sae Rom Lee.