Acknowledgements

I greatly appreciate the comments and edits of Dr. Nancy L. Zingrone (Maggie Larimore in Second Life), Core Adjunct Professor of Psychology in the School of Behavior and Social Science at Northcentral University.

Permissions

Virtual Worlds Teaching Manual by Gregory Perrier is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>4</td>
</tr>
<tr>
<td>Brief History of Education in SL</td>
<td>4</td>
</tr>
<tr>
<td>My Background in SL</td>
<td>5</td>
</tr>
<tr>
<td>Getting Started</td>
<td>6</td>
</tr>
<tr>
<td>Things to Consider When New to SL</td>
<td>11</td>
</tr>
<tr>
<td>The Different Ways to use VWs with Students</td>
<td>16</td>
</tr>
<tr>
<td>Further Considerations</td>
<td>30</td>
</tr>
<tr>
<td>Bringing in Students</td>
<td>33</td>
</tr>
<tr>
<td>Program Development</td>
<td>35</td>
</tr>
<tr>
<td>Handing Off</td>
<td>38</td>
</tr>
<tr>
<td>Conclusion</td>
<td>39</td>
</tr>
</tbody>
</table>
Introduction

Experience has shown that Virtual Worlds (VWs) can provide students a unique interactive educational experience that many students see as a fun way to learn. VWs go beyond just offering text to read or a video to watch. In VWs students interact with objects. For example, a student can study the diagram of an ear online or in a textbook; but in a VW the student can move through a 3D model of an ear, a whole different experience. Studies have shown that students learn more from doing, than from reading or listening to a lecture, and VWs have the potential to provide this hands-on learning experience in a cost-effective manner. Furthermore, teaching students to function in virtual environments provides them with skills that will be beneficial, if not critical, for success in the future job market.

The aim of this manual is to help educators incorporate VWs into their courses in ways that enhance student learning. It will guide one through getting started and show them how to use VWs to make classes more fun and interesting. It will help them avoid the common errors educators made in VWs and allow them to build on the successes of others. The advice presented here comes from work in the VW called Second Life (SL), but much of this advice applies to other VWs, such as Open Simulator, as well as to virtual reality (VR).

Brief History of Education in SL

SL started in 2003, building on earlier VWs. With SL a person or institution could pay for the use of an area and build whatever they desired on it. Soon after SL started, people in higher education started to explore it and to consider how instructors could use VWs to enhance education in general. Adoption of VWs for education has followed Gartner’s “hype cycles”, which predict periods of initial excitement, followed by disillusionment, and then slow adoption for new technology. Prior to 2012, there was considerable excitement about VWs being a major component of the future of higher education. By 2010 (when I entered SL) numerous colleges and universities had built a virtual campus in SL and several educationally focused groups were meeting regularly there. The International Society for Technology in Education (ISTE) had a large welcome center and orientation for educators new to SL. However, while most higher education institutions present in SL had some staff and faculty members active there, few instructors had incorporated SL into the curriculum of a course.

The steep learning curve for VWs and the fact that there was little instructor input or buy-in with the activities created on the virtual campuses resulted in few faculty members becoming active in VWs. Because most of these virtual campuses were little used by faculty and students, many of the virtual campuses closed when in 2012 Linden
Labs (the company that owns and runs SL) ended the 50 percent educational discount on the cost of having land. Education in VWs entered the period of disillusionment.

Those virtual campuses that did survive in SL after 2012 were often more innovative, having designed builds suitable for a VW, rather than trying to recreate their main campus in SL. These builds were often driven by faculty who had seen a potential for incorporating VWs into their courses. Some of these institutions have maintained a presence in SL and their faculty members continue to use the platform to promote student learning. And surprisingly, many of these institutions continue to receive the 50 percent education discount.

From this experience emerged many lessons on how to incorporate VWs into a college class. We can learn from the failures that led many higher education institutions to abandon SL as well as from the successes of those instructors who pioneered ways to enhance their courses using this new educational tool.

**My Background in SL**

In the fall of 2009, I saw a magazine article predicting that VWs would be an exciting new tool that higher education would adopt widely. The article had an image of a professor in SL lecturing in front of a classroom full of avatar students. I was intrigued and saw this as a way to lecture when my college (the Northern Virginia Community College, called NOVA) closed due to snow or other problems.

I attended a profession development day at NOVA in January 2010 and was pleased to see that a workshop on Second Life was offered. I was surprised to learn that NOVA already had a virtual campus in SL. I made an avatar at the workshop and over the next few months I worked on developing my skills, visiting many different education regions, and networking with other educators in SL. By 2011, I started assigning graded activities in SL for the students in my classes. In December 2011, the person managing NOVA’s region there retired and I was asked to assume this role. Over the next six years I added various activities to the region. I held workshops for NOVA faculty on how to use SL in their classes and helped some faculty members become active. By December 2017 there were 22 activities on NOVA’s virtual campus and about 500 students a year were completing graded assignments on the region. Since my retirement in December 2017, this number has stabilized at over 400 students per year.

In 2017, as I neared retirement, I started to reflect on what I have learned from this experience and the experiences of other educators active in SL with whom I collaborate. Over about 6 months, I collected these lessons, shared and discussed them with others in presentations in SL and finally organized them into this manual.
You can read more about my experience in VWs on my blog: https://blogs.nvcc.edu/gperrier/.

Getting Started

First steps

This manual assumes that you are an educator who teaches a for-credit class, either face-to-face or online; and that you are interested in exploring the potential of incorporating Second Life or other VWs into your curriculum. If you already have an avatar and have been in SL, you can skip this section and scroll down to Exploring.

To get started, you need to go to www.secondlife.com to select an avatar as well as create a username and password for this avatar. I suggest you initially select one of the classic avatars (one of the options) because they are easier to work with for beginners. You can always change your avatar type and style later. Next you need to download and install the free Second Life program, using either the standard viewer at www.secondlife.com or the firestorm viewer at www.firestormviewer.org. Either viewer is fine, but people tend to migrate to the Firestorm viewer after being in SL a few months. So, I suggest you start with the Firestorm viewer. The icons are slightly different in the different viewers and any directions provided in this manual will be for Firestorm. Also note that the controls are slightly different for a Mac and a PC computer. Both viewers, plus several others that are less used, allow your avatar to function in SL. The other virtual worlds, such as Open Sim (OS) and Minecraft, all require an avatar be created, a username and password selected, and a viewer program downloaded and installed.

If this seems confusing, there are many YouTube videos that will show you how to get started whether you are using the Second Life viewer or Firestorm. The video I’m recommending shows you how to get an avatar, install Firestorm, log into SL, and get to different regions in SL. It is available at https://youtu.be/V_pCMfG8yCM. This video will take you to the NOVA region, but the principle is the same for going to any region in SL. The details of getting an avatar change with time, but the basic steps are similar.

Once you open the SL viewer, you enter your avatar username and password and log in. After you accept the terms, you will appear (rez) at a greeting center where you can learn a variety of basic skills before you move to an orientation region. There are two orientation regions you will want to visit to help you get started. The first is Caledon Oxbridge which offers an excellent orientation to SL (see image page below). Much of what you learn there applies to other VWs as well. Often at Oxbridge you will find tutors and other people who can answer your questions about SL.
The second area to visit is the Science Circle, where towards the southeast corner there is a tall tower called the Education Portal - Gateway to Thinking (see image page below). The portal offers an orientation to teaching in SL. A lot of information is available there and so plan on visiting repeatedly over months as you become more proficient in SL. At the base of the portal is a sign that when you left click on it will give you a notecard providing a detailed overview of the portal and what is on the different levels.

Caledon Oxbridge Orientation Area

To move from the greeting center to either Caledon Oxbridge or the Science Center regions you open the map icon on the toolbar (looks like a map folded in three sections) and in the box next to Find, enter the names of the region you wish to visit (see second image below). Once you enter the name, left click on Find. Left click on the region’s name in the drop-down menu and left click on Teleport, and you are there.

Your initial experience in SL will vary greatly depending on whether your educational institution has an area in SL or not. If your institution has a region (whole area) or parcel (part of a region) in SL, you should go there and make that your SL home.
If your institution does not have an area in SL, you can make Caledon Oxbridge your initial home. Oxbridge has a Scholars group you will need to join before you can set the region as home. Once you leave the entrance hall, you will be in an open plaza area. On the right side of the plaza is the lecture hall and to the left side of the entrance to this hall is a calendar showing the class schedule. Just to the left of this calendar is a poster (see image below) that when you left click on it will let you join the Scholars group.

Once in the group, you need to go to the rose garden area (see image page below), just behind the stone benches in the seating area. Once there you can set the region to home by opening the World button on the top toolbar and select “Set Home to Here.” Clicking on the house icon near the top left of your screen will always teleport you back to your home. This is useful in case your avatar gets stuck or encounters uncomfortable situations. Caledon Oxbridge is monitored to provide a safe and enjoyable experience.
One caution to keep in mind is that VWs are dynamic, and things frequently change. The instructions provided above are accurate for 2019 but expect some differences later. Most people new to VWs are surprised at the constant changes. Regions you found interesting or fun to visit disappear, while new regions are constantly being created. New technologies are being introduced allowing more realistic avatars and objects but requiring you to learn how to use them. The rate of change is slow enough to not be stressful but expect changes.

Exploring

After completing a basic orientation to SL at Caledon Oxbridge, it is time to explore. The objective is to get a feel for how people are using SL for education. You want to visit as many educational regions as possible and see how they developed their region and what student activities, if any, are taking place there. The bottom three levels of the Education Portal provide landmarks to many educational areas. Regions come and go in SL, and so do not be surprised if some of the regions listed at the Education Portal do not exist any longer. Often avatars that you will encounter at these regions are random visitors and not involved in education or associated with the institution using the region. Feel free, however, to text chat with people you encounter at these regions. Visit colleges, universities, and other regions with an education focus and think about how you might use the activities that you encounter in your classes.
Networking

Though much reduced since early 2012, there is still an active education community in SL as well as several educational groups that meet regularly there. Getting involved with them is a great way to network. Level 6 of the Education Portal provides a list of these organizations, what they do, when they meet, and contact information. They welcome people new to SL to join them at their meetings. Take advantage of the wealth of experience available within these groups to assist you. The groups are: the International Society for Technology in Education - Virtual Environments Network (ISTE- VEN), the Virginia Society for Technology in Education (VSTE), the Virtual Worlds Education Roundtable (VWER), the Virtual Pioneers (VP), the Science Circle, Techsoup, the Nonprofit Commons, Virtual Speaking Science, and the Chilbo Education Village. Join the groups associated with these organizations to get announcements of up-coming events.

During your first few months in SL focus on visiting educational regions, networking with educators active in SL, and making repeat visit to the education portal, all aimed at expanding your understanding of education in virtual worlds. At the same time work on your basic SL skills, such as moving, teleporting, interacting with objects, changing clothes, rezzing objects, and building simple objects. Finally, explore the different icons and menus in Firestorm and become familiar with what they are used for.

Things to Consider When New to SL

Before you bring students into SL, there are some things to consider that have emerged from the collective experience of educators active in SL. Incorporating these considerations into your planning will greatly reduce the difficulties you might encounter as well as reduce student frustration. These considerations are divided into 5 themes: professional development, students, instruction, land, and building.

Professional Development

There are a variety of opportunities in SL and in real life (RL) to enhance your understanding and skills concerning education in VWs. They tend to be in the form of meetings of educational organizations (which were discussed above), workshops, profession presentations, and conferences. Take advantage of these as often as possible. Besides increasing your ability to use VWs in education, these events offer you an opportunity to build a network of friends and colleagues in SL who can advise and assist you.

These professional development opportunities are provided by educational organizations active in VWs. The Education Portal discusses these in some detail.
They generally have weekly meetings and offer an excellent venue for networking and meeting other educators active in VWs.

The times listed for events in SL are given in SLT (SL Time) which is the same as PDT (Pacific Daylight Savings Time) in summer or PST (Pacific Standard Time) in winter. This is the time in San Francisco, California on the west coast of the USA where Linden Labs is located. You will need to know the time different between SLT and your local time to get to professional development events at the correct time. SLT changes with the change between Standard Time and Daylight Savings Time in the USA and this might require an adjustment in the difference between your local time in STL depending on where you live.

There is a rapidly growing literature on education in VW. These articles are found in peer-reviewed journals as well as in many other publication venues, both in print and online. They are often focused on specific disciplines: for example, I recently saw two peer-reviewed journal articles on medical role-play in SL. Explore the literature about the use of VWs for education in your subject area. One caution I have found with the literature is that the research is often conducted by graduate students who have never used a VW with students in a for-credit class.

Students

Not all students will love SL. My student evaluations have shown that about 10% of the students hate SL and about 25% get excited and tell you it is a great learning experience. The remaining 65% find parts of the activities fun or interesting, but get frustrated with other aspects of SL. The more you can reduce student frustration; the more students will enjoy learning in a VW. Very few students will continue in SL after the class.

Usually most, but not all, of your students will be able to access SL from their own computers. Students whose personal computer lacks a good graphics card or who have a weak internet connection tend to have more problems working in SL. You will need to ensure that some student computers at your institution have an up-to-date SL program installed so that all your students can access SL and complete the required activity. Note that students can often do a temporary download of the Firestorm program on public or college library computers. Do not expect campus IT to be happy about maintaining SL on student, classroom, and lab computers, but do request this as needed. The viewers have frequent updates and the latest version of Firestorm needs to be installed about every 6 months as older versions stop functioning.

One frustrating aspect of SL is that only about five different avatars can be created during a day from one college server. So, you cannot have all the students in your class come to a computer lab, get avatars, then go into SL and complete an
orientation or activity. Thus, you should have the students create their avatars before coming to the computer lab.

**Instruction**

The many ways that educators are using VWs to help students and promote learning are discussed in detail later in this manual. As you explore educational regions in SL, look for these different types of activities and become familiar with their strengths and weaknesses. In general, you want to use those educational techniques that you are comfortable with, that meet your lesson objectives, and that expand student learning without increasing student frustration.

In the past, IT specialists would build a structure on a college or university region in SL and expect professors to send their students to learn by interacting with the build. I visited a university’s region in SL just before it was completed and talked to the builder. He had built a lovely greenhouse (see image below) but when asked, he had no idea how faculty members or students would use it. This disconnect between the design and building of an activity and the expected users results in very low adoption.

**Greenhouse build on the region of a university.**

![Greenhouse build on the region of a university.](image)

A better sequence is just the reverse. Start by determining what you want your students to learn in SL. Then determine what is the best educational tool in SL to achieve this educational objective. Next decide what things you need in SL to use this educational tool. Do you need an interactive model of something, or an area with posters, or a meeting area with chairs, etc? Finally, obtain and install what you need to achieve the learning objective by either purchasing or building the necessary items. In
this case, you develop a learning objective appropriate for a VW and then acquire the necessary items to achieve the objective. For a horticulture class, a greenhouse with plants might be appropriate, but it is then developed as part of a lesson and you know how the students will use it.

When interacting with students in SL, use text chat (for avatars within 20 meters) or IM (Instant Messaging for people further away) as much as possible rather than voice. This allows students to copy and paste your text into a Word document, so they have a record of what was said. Students can even set options in the SL program so that text chat is saved to their computer. Some students will have problems using or hearing voice. Using text chat and voice with groups is discussed later.

One unique aspect of teaching in a VW is that a region can restart at any time and everyone must leave the region for at least 5 minutes or log out of SL. This can be very disruptive, especially for group activities. You will get a notice 5 minutes before the region closes. So be prepared to inform students what to do: relocate to another region within SL or log off for 5 to 10 minutes. Most regions restart at a specific day and time each week, and those restarts can be anticipated.

As you diversify in your use of teaching activities, learn to use the slide screens whiteboards, and web-boards in SL as well as group chat and group voice. When marking on a whiteboard in SL, using a stylus and tablet attached to your computer works well. To load images into VWs, you import them as JPEG files and load them as a texture on a poster board or into the content file of the slide presenter. The Education Portal at the Science Circle region covers the use of these items in detail.

When you design an educational activity in SL, consider how you will assess student learning. There are many options for doing this, a few examples are presented here. An activity handout can end with a set of questions for the students to complete. Or, if the students make an object (for example, the glucose molecule activity on the NOVA SL region) have the students take a photo of that object and submit it for a grade. If the students are engaged in role play, after the role play, see if the students captured the lessons presented to them through an online discussion.

It is very difficult to ensure that students do the work themselves in a VW unless your avatar is there with them. For any activity where the students are working independently in a VW, be aware of this issue. You can have the students send you a photo of their avatar at the site, so you know they were at least in the right location. You can use a visitor counter to determine how long the student was on the region. If the student submits completed questions for an activity that takes most people 30 minutes, but the student was only on the region for 2 minutes, you know that student copied the answers from another student and only took an avatar photo to submit.
As often as is reasonable, use both formal and informal means to evaluate the educational value of the activities and then modify the activities to improve the educational experience and reduce student frustration. I find about 10% of student feedback on evaluations is useful and modify the handouts and builds on the NOVA SL region each year based on student comments.

Land

It costs money to have and maintain an area in SL. When you are on a region or parcel be aware that someone is paying Linden Labs either monthly or annually to use that area. So far (2019), Linden Labs continues to provide an educational discount on the annual tithe for a region. For the last several years (2012-2019) the educational discount cost for the NOVA region has been $1,770 for one whole region (256 meters by 256 meters and 20,000 prims (objects). That amount is about half the annual tithe without the discount.

Because of these costs, it is difficult for an individual to support a region in Second Life. When many college and university campuses closed in SL in early 2012, some educators moved to Open Sim (OS), a different VW that is significantly cheaper but not as robust as SL and supported the cost themselves.

When your institution has a space in SL, it is easy to bring students there for educational activities. When your institution does not have a space in SL, however, then you must work within your network of friends in SL to see who has a space you can use or rent. Many people are willing to let you use a part of their space for free provided the area you need is not large and the number of prims you will be placing there is small.

Building

When you visit a region in SL realize that everything you see there (buildings and other structures, educational activities, equipment, plants, animals, etc.) was built by someone and added to the region for a reason. Linden Labs provides only a bare piece of land. Many of these items can be purchased from the people who built them at stores in SL or online at the SL MarketPlace website. To purchase things in SL you use Linden Dollars (L$). You can set up your avatar account so that you can purchase L$ using a credit card or a PayPal account. There are about 260 L$ in one US Dollar, but the exchange rate varies.

Building is both a skill and art and it takes time to learn. There are regions such as the Builders Brewery and Happy Hippo that have displays that help you learn to build. In addition, the Oxbridge orientation area offers classes on building. Slowly over your first year learn the basics of building.
You will need permission to build on a region in SL. You can get this by renting the land or belonging to a group that has building permissions on that region. Sandboxes are small areas (parcels) on a region where anyone can build an object temporarily. If you do not take this object to your inventory or delete it, the object is returned to you after a few hours and put in the lost and found folder in your inventory. The Caledon Oxbridge region has a great sandbox.

There is usually no need to duplicate activities others have already built in SL. You can ask the region owner to let your students visit those sites. With approval, you should treat those activities the same as the ones on your own area in terms of how students are expected to use them and be assessed.

The Different ways to use VWs with Students

Once you have visited several educational regions in SL, have developed some contacts with other educators in SL, and have mastered the basic skills needed to function in SL, you are ready to bring in your students in ways that integrate into your curriculum and enhance student learning. Most educators new to VWs have little understanding of the numerous ways VWs can be used to enhance learning. For example, I came into SL thinking I would use this program to lecture to my students during days the campus closed due to snow. Unfortunately, lecturing in SL proved impractical for me. By visiting various education regions and networking widely, however, I was able to identify more suitable ways to use SL to help my students learn. Most of the activities described below have been used by professors on the NOVA region is SL. As you examine the different activities discussed below, consider which ones might help you better achieve your teaching objectives.

With several of these activities the professor must talk to students in the virtual world. There are three ways that a professor can talk to a student: text chat, instant message (IM), or voice. Text chat can be heard by anyone within 20 meters of the speaker and works well with a small group, such as office hours or a review session. IM is only between two avatars and has no distance limits. You can use this to help individual students when they have a problem in SL, but you do not want to embarrasses them. You can also use IM to help a student who is further than 20 meters away, such as someone wondering the region trying to find the office hour or review area. One advantage to students of using text chat or IM is that they can copy the text and paste into a Word document to later review the answers to their questions. With voice an avatar talks to other avatars that are close to them. Voice is usually used for presentations where the presenter uses voice and audience member ask questions or make comments in text chat. Often students have problems hearing voice because of computer issues or being in a noisy environment. When students use voice, they need to turn it off when finished talking or there are distracting background noises and
typing sounds. Obviously, students cannot copy the voice information into a Word document. For this reason, I recommend using text chat when working with students. If everyone you are talking to has joined a SL group, you can also use group chat or group voice to address all of them at once.

1. Office hours

   Holding office hours in a virtual world is one of the easiest ways to start interacting with students. No movement or manipulation of objects is required other than sitting in a chair. Students come to a set location “the office” on the virtual campus during a given time. These office hours can be held concurrently with normal office hours or held separately, often during evening hours. It also offers a way for an online instructor to meet with students as it is more personal and interactive than exchanging emails. The best offices I have seen are outside in a pleasing landscape with about five chairs (see image below). I found that more students came to my virtual office than to my real office because they can come from off campus, it is less intimidating, and they have a written record of what was said. During the first two weeks of the semester, I give students a few points for visiting me in SL during office hours, so they get into SL and know where to come for help.

![Students visiting during office hours](image)

2. One-on-one student consultations

   This is different from office hours in that only one student comes at an appointed time to meet with their professor. This has been used at NOVA in an online writing class where the professor met with each student separately to discuss their writing.
3. Review sessions

With this method, a group of students comes to the virtual campus at a given time to meet with their professor to review for a pending exam. This review option is particularly useful when a scheduled exam review had to be cancelled due to a college closure. Depending on the number of students attending, the review can be held in the office hour area or in a virtual classroom. If the review is being held outside of the scheduled lecture period, some students will not be able to attend. The professor should rotate the questions among students and should plan to adjust as some students come late and insert themselves into the rotation. If there are many students, you can save time by having students type their questions in text chat but not send them until it is their turn to ask a question.
4. Lectures

In general, lecturing in virtual worlds should only be used when the students are geographically scattered and cannot attend the lecture in a real classroom. A lecture in a virtual world lacks the student–professor interactions of a real lecture that come from body language and facial expressions. In addition, bringing a large group of students together in a virtual world at a given time is fraught with problems. When there are many people in one location in a virtual world the computers often experience lag and react slowly. You can also expect that some students will not be able to hear the lecture in voice or that some students crash out of the Second Life program. New avatars have the default sleep settings and fall asleep after 5 minutes of inaction, thus you end up talking to a group of sleeping students (see image below).

When students or members of a group cannot be collocated, however, then a virtual classroom offers a tool to present material in a lecture format. The professor can talk in voice, but everyone else should have their voice off to avoid distracting noises. It is best if the voice presentation is augmented with pre-prepared entries in text chat so attendees with sound problems can still participate. Questions or comments from the students will come in text chat. Talking, pasting text into chat, and reading comments in chat at first feels like a juggling act. But with practice, one can get comfortable with it. Lecturing in a virtual world requires a classroom that is easy to access and having chairs that are easy to sit in. Slide presenters, whiteboards, and web screens are all available in Second Life as tools to augment the lecture. Information on how to use these tools in SL is available at the education portal. This format is also used for giving presentations to groups in SL at meetings, workshops, and conferences. Addressing a group of people experienced in SL is easier for they know how to address the problems.
5. Interactive activities for students

With this method, students independently or in small groups interact with one or more objects in a virtual environment and gather information by collecting data, studying structures, observing changes occurring in objects, reading text in notecards or viewing images (see image below). I find that it is very helpful to provide a handout to each student giving detailed directions on how to access and interact with the objects. Handouts seem to work better when they have concise instructions in short paragraphs and when numerous images are inserted. Using the information learned from interacting with the objects, the students should then be able to complete a series of questions found at the end of the handout and send the answered questions via email or a Learning Management System (LMS) to their professor for a grade. Each student also takes a photo of their avatar at the site to demonstrate that they at least visited the virtual world.

At NOVA we have used interactive activities in several ways. Some professors assign certain activities as part of their class and students submit the questions for a grade. Many of the activities parallel our biology labs and can be used as a makeup lab when labs are cancelled. We currently have 19 different interactive activities on the virtual campus.

Students completing a macromolecule interactive activity

6. Models

Models allow student to explore a structure. The example in the image on the page below is an ear, but students can also explore historical sites (e.g. Paris 1920) or historical structures (e.g. the Globe Theater in London). Assessing learning from
models needs to be carefully considered. The human organ models at NOVA have numbers on the different parts and students enter the numbers next to the part names in a table in the handout for a grade. Students could be given a series of questions to answer concerning their observations of a historical structure. Visual learners find exploring a large 3D model an effective way to learn.

A human ear model.

7. Displays

Displays are panels or slide screens set in a virtual world where students come and read the panels or slides (see top image page below). These have been used at NOVA to help prepare students for quizzes in the health sciences. One slide can ask a question providing multiple choice answers and the next slide provide the correct answer. The professor could distribute these slides in a PowerPoint file, however, the 14 stations at NOVA each with up to 10 slides boards provides an easy way for students to access and study this large amount of information.

8. Student designs and builds

Students who have at least basic building skills in the virtual world can design and create an object or scene. If the students also have at least basic coding skills, they can script these objects to do different things. I have seen this used in a stage design class for theater, but this can also be a useful tool in architecture, engineering, and computer science classes. This is also used when students move existing objects around to build a larger object. For example, at NOVA they move virtual atoms around to create a glucose molecule. A tutorial covering the building and scripting skills
required should be provided to the students. At NOVA the students can access a YouTube video that covers the required building skills. In addition, children in the primary and middle schools find this an exciting activity in virtual worlds such as Minecraft shown in the second image below or on secure grids in Open Sim, such as BIO4KIDS.

Slides screens used to study anatomy.

A park designed in Minecraft.
9. Role play scenarios

This method is used were skills and understanding are acquired by engaging in a simulated real-life activity. It is primarily used for training in the health science and legal fields. The professor presents a different written scenario to each of two or more students who then assume different roles in the role play. For example, one student can be a new patient with some personal issues at a medical clinic and the other student is a clinic employ trying to determine the patient’s health history, or two teams of law students can be negotiating a difficult divorce case. The professor can be present and provide prompts to keep the discussion going or the students can conduct the role play without the professor using text chat and provide a copy of the text to their professor for assessment. This role play is enhanced when it is conducted in an appropriate virtual environment, such as a virtual medical clinic (see image below) or law office.

Medical clinic on the NOVA region

10. Art Education

There are several ways that an art class can use VWs. Student paintings and sketches can be displayed in an art gallery. In this case, a digital image is made of the student art, saved as a JPEG file and imported into the VW as a texture. A thin, rectangular prim is created, and the texture applied to one surface of the prim. The image below is of the student art gallery on the NOVA region in SL.
There are a variety of art museums in SL. Students in an art history class can visit a museum and study different periods of art or the works of specific artists. The instructor can select specific art pieces that the students must focus on. One of the more impressive art history museums can be found at the Science Circle region.
11. Language training

VWs offer interesting platforms for language classes. A professor can have native English speakers studying a foreign language meet in a virtual world with students who are both native speakers of the foreign language and who are studying English. At NOVA students in China studying English have met with students in the United States studying Chinese (see image below). The students addressed given questions in text chat for a set amount of time in the foreign language and an equal amount of time in English. Then the students can move to an unstructured conversation using voice. The text chat is copied and sent to their instructors for assessment. This requires coordination between the professors in both countries as well as a location on the virtual campus where the students can conveniently meet. Groups of students chatting and talking must be at least 20 meters apart to avoid text and voice interference. The students can also collaborate on a slide presentation that they give to other students from both classes. Issues we encountered at NOVA is that students in other countries can have difficulties accessing the VW program and problems finding a time that worked for both set of students.

Chinese language student area at NOVA.

Another way VWs are used to enhance language training is to have students use the language to engage in common activities in a virtual recreation of a community using that language. For example, students studying Chinese can move around a virtual Chinese community and try to order food in a restaurant (see image page below), rent an apartment, buy a train ticket, etc. Considerable building and scripting skills are required to create such an environment. Monash University in Australia uses these
methods very effectively for Chinese instruction and to prepare students for study abroad trips to China.

The restaurant at Monash University’s Chinese Island.

12. Student presentations – posters / slides

With this method, students develop a poster (see first image page below) or a slide presentation on a topic they have independently studied. The instructor can adopt a conference poster session format and have the students use voice to present their posters to faculty members and students and then answer questions. If there are many student posters this can be time consuming. In this case, each student can provide a few questions from their poster which all the students answer and turn in for a grade. Students are graded on the design of the poster and the material presented. To create the poster in SL, the students prepare a slide in PowerPoint, save it as a JPEG file, and send this file to their instructor. Either the instructor directly or the region manager brings the JPEG file into SL as a texture. This texture is then added to the poster board under textures in the edit mode.

Slide presentations are slightly more difficult in that they require a slide presentation board. The student stands near the slide board and uses voice to give their presentation. Students and faculty then ask them questions. To add slides to a slide board, the slides are saved as JPEG files and imported into SL as textures. These textures are added to the content file of the slide presenter in the edit mode. The slide boards allow an avatar to advance the slides as in a normal slide presentation. This method is used effective with genetics classes at the Texas Wesleyan University region in SL (see second image page below).
For both posters and slides an area needs to be set aside and a poster board or slide presenter set out for each student. Because it requires region building rights to set up the boards and load the images, someone with building rights must set this up.
13. Tours for students and educators

Tours offer a fun way to show students recreations of specific environments such as 15th century London, the Grand Canyon, or a virtual medical clinic. In addition, tours of campuses or specific educational builds developed by other educators provide a fun and often interesting professional development opportunity for educators active in virtual worlds (see image below). Tours are a nice way to highlight what innovations you have developed on your region. The image below shows an education class from George Mason University touring NOVA’s region as part of their education in virtual worlds class. Teachers in K-12 grades have displayed SL on a large screen and taken their students on a tour of a historical site recreated in SL.

An education class touring NOVA

14. Educational games and hunts

Interactive games where students must answer questions to proceed further and get small prizes can be a fun way to learn. With hunts, students must find different objects spread around the campus and answer the questions associated with each object (see image page below). Usually an object gives clues to the location of the next object. Games can also be used for assessment of learning and are generally more interactive and fun for students. Building games requires you to have good building and scripting skills.
15. Videos (machinima) tutorials

Students can make their own short videos (called machinima when shot in VWs) and share these with the rest of the class. This could be an activity suitable for an art or photography class. Jing (www.techsmith.com/jing.html) and Obsproject (https://obsproject.com) offer free programs for making these videos and offer limited editing capacity. Camtasia is a program that can be purchased and offers many tools for making, modifying and editing videos. You can do a Google search to find videos on how to use these programs. The machinima can be saved as an MP4 and posted on YouTube for students to access.

For more difficult interactive activities, it is often useful to make and post on YouTube a short video showing students how to complete the activity (see image page below). The following URL will allow you to view a short machinima for an example on how this tool works:

http://www.youtube.com/watch?v=VI8ThkvFQMo&feature=related
Further Considerations

By now you hopefully have explored various educational regions to see how they are incorporating VWs into their classes and you have developed a network of educators active in VWs to provide you guidance and support. You have also reviewed the different ways educators use VWs and considered which of these is most appropriate for your students and the material you want to teach in VWs. You are almost ready to bring your students into a VW. There are, however, a few additional considerations to be aware of first. These considerations are divided into two themes: students and building.

Students

Your students will have varying degrees of computer skills and invariably some students will have difficulties getting an avatar and moving to the activity they are to complete. Over the years I have improved and expanded the guidance available for students to get them started so that now few NOVA students express difficulties. Getting this correct is important for reducing student frustration with VWs.

At NOVA there now are three levels of guidance and assistance for students getting started in SL. All students receive a handout (posted on the institution’s Learning Management System by their professor) that provides detailed instructions on how to download and install Phoenix Firestorm on their computer, how to get an avatar, as well as how to log into SL and get to the NOVA region. Once at the NOVA region,
there is a separate handout for completing each activity. The introductory handout also instructs them how to get to the Caledon Oxbridge region for an orientation to SL, covers some of the basic skills they will need to complete activities, and discusses security in SL.

Some students need additional help. For them a 25-minute video was made that covers the material in the handout. The video was loaded into YouTube and the URL (https://youtu.be/V_pCMfG8yCM) provided in the handout. After the video was posted only a handful of students still needed help. Initially, I had set times during the first week of classes each semester that I would be available in the student computer lab to help students get started. I was later able to train staff in the student technology lab to carry out this function. Now students can move as needed up the levels of assistance from the handout, to the video, to in-person assistance.

I have found that encouraging students to complete an orientation when they first enter SL greatly reduces their frustration with working in a VW. There are many good orientations in SL and so no need for you to duplicate this. I suggest they visit Caledon Oxbridge and my handout tells them how to get to that region. But the orientation at Oxbridge is more comprehensive than students need and so I tell them which parts to complete. Rockcliffe University has a nice orientation also at its Gateway region. The orientation at Virtual Ability region is fun for students as well, with lots of good activities as people walk through a water garden and other areas. Visit these different orientation sites in SL and select one appropriate for your students.

A few of the possible activities discussed above (such as reviews or poster presentations) students do in a group. But most of the activities can be done by students on their own. I think it is important to allow at least a week for students to complete these activities. This reduces the number of students on the virtual campus at any one time, reducing lag, and allows students more time when or if they have technical problems. Many students, however, will work on the activity at the last minute, complaining they cannot do the assignment if they have technical problems. You should expect this and remind students several times to complete the assignment early and not accept excuses for those students who wait to the last minute and complain of technical issues.

Second Life has a reputation of having erotic material and things unsuitable for an educational institution. In the initial handout giving to students to help them get started, I compare SL to a large city. There are often about 50,000 people from all over the world active in SL at any given time and while most of them are respectful, some will not be. And there are areas were a student might feel uncomfortable. But I tell them that if they stay on the NOVA region, they should not be bothered. I also put code of conduct information in all my handouts. I then ban people who will not stop being disruptive, rude to others, or are consistently inappropriately dressed for the NOVA region. Fortunately, I have only had to ban one student in seven years. If you do not have permission to ban avatars, ask the region manager to do this for you.
It is possible to restrict the avatars using a region or parcel to those on a list. Some colleges and universities adopt this security measure to keep troublesome visitors off the area. To do this, however, you need to know the names of all the student avatars who will come to the area to complete an assignment and enter those names on a list of permitted avatars. If you expect several classes to use the campus, I suggest you keep the campus open because most instructors will not be able to provide you their students’ avatar names. Also, an open campus allows other educators to visit and promotes networking. The exception is for K-12 programs, which need very secure regions.

Building

Building is fun and creative, but the difficult part is translating the build into an assessable educational activity. Avoid spending so much time on building that the educational part is neglected. For difficult builds and scripting, it is better to use small grants to pay people with these skills to create the build. You will still need to design the build and be involved in its development to make sure it meets the educational objectives.

There is no need to duplicate your institution’s real campus in SL. Many colleges and universities spend considerable time and costs to recreate the signature building at their institution. Some people feel these familiar buildings make SL more welcoming to students, but my experience is that students quickly adapt to an open building format. Also, these buildings were seldom used for educational purposes because it is difficult for people new to VWs to enter and move around inside these buildings. SL allows builds to be much more creative and accessible, reducing student frustration.

When building structures, favor open and roomy structures rather than enclosed and confining ones. This is in part a personal preference; but I have found that people new to SL function much better in open roomy spaces. Outdoor office such as a deck or beach with a few chairs work well. Make walkways and stairs wide and have doors automatically open as one approaches. When possible, it is better to avoid doors on buildings. Walking down sidewalks and opening doors are frequent problems for people new to SL.

When students are expected to sit, select seats/chairs/cushions that are very easy to sit in. Avoid seating that can put students sideways or backwards. If it is possible to mess up sitting, students will, which can be frustrating for them. Test and adjust your seating before students come to make sure when they sit, they are facing the correct direction.

If you have students doing an activity in a forest environment, make the trees phantom so that people can walk through them. This makes it much easier for people
new to SL to navigate in a forest. To do this, go to edit mode for each tree and under general, select Phantom.

To avoid textchat and voice interference, keep meeting areas and faculty offices at least 25 meters apart. If you are the region manager, you can create small parcels on the region and have voice and chat restricted to the parcel.

Once your campus has several activities and different areas, provide a menu driven teleporter that makes it easy for students to move to the desired activity or location. It is amazing how lost students can get. These teleporters are available online in SL Marketplace.

Provide a pleasing landscape to the campus or area you are using, make it visually and acoustically appealing. Consider lighting for night and other light conditions. You can also add a few fun things to your campus: balloon rides, boats, dance balls, animals, nature sounds, etc. to make it more entertaining for students. Plants and other landscaping items are available for purchase in SL Marketplace.

If no one is using your region or campus in SL you can expect random people to build on the campus, usually high in the sky. Once you do start to use the campus, you need to find these builds and return the prims. It is a good idea to check your sky up to 4,000 m every few months and return things that should not be there. To avoid this problem, make your land settings so visitors and students can only build in sandboxes and they cannot move things out of the sandbox.

**Bringing in Students**

Now you are ready to develop an educational activity in a VW and to bring in your students. Before ever rezzing a prim, I suggest you answer the following 6 questions.

1. Who is your audience in RL?

   How knowledgeable on the topic do you expect them to be?

   How proficient with computers do you expect them to be?

   What quality of computers will they have access to?

   The education activities need to be designed appropriately for the audience.

   You need to focus on reducing the level of frustration with both the level at which the subject matter is presented and with the technology.
The wider the audience’s range in these factors, the more difficult it is to develop a good design.

2. What is your audience’s VW skills?

How proficient in VWs do you expect them to be?

Guidance on getting an avatar, installing the program, and getting to the correct location in the VW needs to be designed appropriately.

The educational activities need to be designed appropriately.

The landscape and buildings need to be designed appropriately.

The goal is to both reduce the level of frustration with the program and increase interest and enjoyment.

The wider the audience’s range in VW proficiency, the more difficult it is to develop a good design.

3. What understandings, knowledge, or skills do you want them to learn?

Write each item as a concise statement.

4. What builds and scripts are necessary for students to learn this information?

Focus on reducing frustration and making it fun.

Get comments from the people you expect to use it (beta testing). Have them test the notecards, handouts, assessment tools, builds, and interactions with objects.

Make builds and landscaping visually and acoustically pleasing.

5. How will you assess if the target audience learned the desired information?

Use these assessments to improve the activity.

If assessment is voluntary, then make assessment fun, a game, or challenge to increase the response rate. Track your response rate.

6. How will you get and aggregate the information collected on use and learning?
Use this information to monitor the program’s growth and development as well as to solicit grants.

As you develop your educational activities there are a few considerations to keep in mind. The most important is to accept that the design of these activities is a work in progress. It is an iterative process where you design, build, monitor, evaluate, and redesign. So, when your educational activities are not giving the desired results, determine why and redesign the activity. For example, if you find that the activity requires students to have a level of skill in VWs that few will have, redesign for a lower level of VW skill. This requires that you remain flexible with the vision for the activity. It is the educational experience and learning that is important, not a specific design.

When providing handouts for activities, make them available on the virtual campus as a notecard, so visitors can also do the activities. I find some high schools and universities that are active in SL send students to the NOVA region to complete specific activities. Tables in handouts are hard to save in notecards. Thus, when handouts contain tables, they can be saved online in a wiki or other program and the URL for obtaining the handout provided in a notecard available on the virtual campus.

When working with a group (students or visitors), I put everyone in a SL group and use group voice or group IM to talk to everyone. Voice and text chat only function up to about 20 meters. Putting everyone in a group allows you to talk to everyone even when they are out of voice and chat range. You can always expect at least a few people in any group to get lost or to wander off.

It is best to avoid getting over 15 students in one location at the same time for an activity using voice (sound rather than text). There will always be students with technical difficulties that prohibit them from gaining the full educational value of the activity. In general, anytime you have a group of students in SL, expect some students to crash and be gone for some of the time, or students to have other technical issues with SL such as with accessing voice, moving, sitting, clothing, etc. This is usually the case even for small groups of students. Often when many avatars are in one region, the computer speed slows down (Lag). All of this results in student frustration with the program. Therefore, holding formal lectures and exams in SL is problematic.

To know which students have visited the SL activity, have a visitor counter on the campus. I keep track of who visits over the semester. I download the counter list to an Excel file several times a week. These numbers are important when documenting use of the campus. People who visit once for less than 5 minutes are probably not students. You will find that several avatars often visit repeatedly for a few seconds. These are bots that check on the status of regions and provide this information to a group of people who rent out parcels in SL.

Program Development
Once you have a semester or two of experience with bringing your students into a VW, you might consider getting others at your institution to use the VW as an educational tool. I call this program development. You are growing from one instructor and a few students (under 50 per semester) using the VW to multiple instructors and many students (over 50 per semester). The advantage of doing this is that once the VW proves to be a viable educational tool at your institution, your administrators will support it financially. At NOVA, the administration pays the annual tithe to Linden Labs ($1,770 per year) for SL and provides small grants (under $3,000) that can be used to improve existing and develop new educational activities. With program development, you are developing an institutional footprint in a VW rather than just an individual footprint.

To successfully develop a program in a virtual environment, a higher education institution needs a part—time program manager with dedicated time and the skills and experience required to help faculty develop activities within the VW or VR. This person promotes the program within the institution, interacts with the institution administration, coordinates program updates with the IT staff for classroom and student computers, and networks widely within the educational community actively involved in virtual environments. It is best if this person has an instructional background and has taught classes in a VW.

From my experience, less than 20 percent of faculty members at an educational institution will express an interest in exploring the educational potential of VWs, and less than 1 percent will make the effort to become functional in any of the VW programs. Why do we see these low rates of interest and adoption?

VWs (including VR) are just one of the many internet educational tools. There are numerous websites aimed at assisting learning in higher education. Many textbooks now come with web-based support material. So, there are many online tools to choose from. And faculty members have limited time to devote to learning how to navigate and function in these various websites.

Because it is an immersive program involving the manipulation of an avatar in a 3D environment, the learning curve to become comfortable and functional in VWs is steeper than for most web-based educational tools. A person needs at least 20 hours in the VW to feel comfortable and many months of frequent use are required to become proficient.

You need to accept that most faculty members at your institution will not obtain an avatar and come into SL and fewer will share your excitement and commitment to teaching in a VW. Therefore, to develop a program you need to design educational activities so that the faculty need only send their students into SL. The students
complete the activity and send something to be graded back to their professor. I encourage faculty members to come into SL and review the activity they expect their students to complete, but few do.

To make it easy for instructors to use SL, for each activity provide a detailed handout for students that walks the student through the activity step by step. Instructors need to simply provide this handout to their students and the students can enter SL to complete the activity. Make the student handouts easy to modify by instructors, so they can tailor them to their curriculum needs. My handouts are all open Word documents that are posted to the Department folder in the College’s Learning Management System.

One important function I have had as program manager is to help bring in images for faculty and their students. There is a cost to do this, but it is low. For example, 100 images cost about four dollars (L$10 per image). The instructor sends you the images as a JPEG file, you adjust the size and load them into SL. There can be more that 20 images for a slide presentation and so it can take some time. Once you have the images you load them into a poster board as a texture in edit mode or into a slide presenter in the content file also in edit mode.

Another big issue is when to let other instructors build on the VW area. It is fun to build, and you want to encourage faculty new to the VW to build. But if someone is not careful when building, they can accidently delete major structures. This has happened at NOVA and it was a major task to get everything restored. To avoid this, have them build in a sandbox first and send you the object to rez on the campus. Once their building skills are developed, you can give them building rights. Limit building on the region or parcel to a specific SL group that you create and add people to this group only when they have the required skills and the need. When others are building, you need to carefully monitor the situation in case there are accidents. Usually you will find that you either do most of the building for the other faculty members or use grants to pay a builder.

There have been a few times that the manager of an educational program in Second Life has unexpectedly died and no one could modify or update their builds. To ensure this does not happen, you should form a small closed management group with trusted associates and make all the objects on your region or parcel owned by this group. Then these objects can be maintained or modified as needed by any member of the group. All builders on your area need to be in this group and set their builds to group ownership.

A good way to start expanding the program is to look to where there is a need for online instruction at your institution and then see how the SL environment might provide for this. For example, make-up labs for snow-day closures, or ways to make hybrid and online classes more interactive. I found that snow-day closures and the need to offer make-up labs online drove many faculty members at my institution to using SL.
As you expand the educational program in a VW, try to provide a range of options for instructors, from being active to the opposite extreme of never coming into the VW. Make it easy for them to send students into the VW to do educational activities and to get assessable outcomes and instructors will use it.

It is important to foster support from multiple levels within the college or university: president, provost, deans, department chairs, IT. Make sure they are aware of how you are using the VW to enhance education and address instructional needs. Promote the program wildly in your institution using internal newsletters, workshops, etc.

When providing workshops and professional develop opportunities to introduce the VW program to faculty and staff at your institution, focus on how VWs can be useful in education rather than getting everyone an avatar and having them visit the virtual campus. I only got workshop participants to follow-up after I stressed the use of VWs in education. When they have an avatar and are visiting the campus, they can quickly become overwhelmed with the obvious steep learning curve required to feel comfortable.

Have extra avatars you can let people use. I understand you can make only 5 avatars per server address per day. To get around this problem, I have 20 alternative avatars (called Alts) that I can let people use at workshops. This saves a lot of time because people tend to focus on editing the appearance of their personal avatar. I have also given these avatars to administrators to have them visit the campus. I can park the avatar where I want the administrators to appear. I have even let students use these avatars when they were experiencing serious problems with their own avatar. Students can also make alternate avatars if there are problems with their initial one or they forget the password.

Once you have students using the campus and a track record of some achievement, look for easily obtained small grants to pay builders to develop new activities or improve existing activities. However, be careful not to rely on grants to pay the annual tithe to Linden Labs. I have seen university programs end when the grant ended because they could not cover the tithe.

Handing off

After years of building and promoting a program of education within a VW, how do you hand this over to others to manage once you retire or leave the institution? Many of the instructors active in VWs are retired now and have faced this problem. Unfortunately, there are few (if any) successful examples to provide guidance. I am currently in the process of handing the management of the NOVA’s region over to a team in the distance education program and from this experience I can provide a few guidelines.
You need to start the process early. I started six months before I retired, but in retrospect this seems too short of a time. I would, therefore, suggest you start at least a year before retirement. Make the process as inclusive as possible by getting all the instructors actively using SL in their classes to participate in the planning process. Also get administrators involved in the decision, especially the administrators who support the region financially. These people often have helpful suggestions and are at least aware that a change in management is going to occur.

In the best scenario, you can identify a full-time instructor at your institution with the interest and required time to develop the VW skills necessary to manage a region. You would then work closely with this person over the year to help them prepare for their new role. If no instructor is available, consider the distance education staff who have experience in developing lessons for online instruction. A person needs considerable experience in VWs to be able to manage a region. So gradually, help them to develop the understanding and skills they need. Start with the simple things and move up to the more complex. The transfer of management responsibilities is a gradual process with you slowly giving up certain responsibilities and the new manager slowly assuming more responsibilities.

Conclusion

We know that VWs provide a dynamic and interactive educational tool that many students find to be an exciting way to learn. And, we now have a much better idea on how to use VWs to present course material in a way that promotes learning and is assessable. We also know how to design educational activities in VWs that reduce instructor and student frustration with the program. With a little bit of effort to learn the basics of a VW, an instructor can quickly start to incorporate VWs into their curriculum. As their skills and understanding develop, they can start to design interactive builds and activities tailored to the material they teach. As other faculty members at their institution see the value of using VWs as a teaching tool, adoption of VWs expands within the institution and the program grows, receiving institutional funding and support. This manual is designed to help you get started using VWs with your students and to guide you through these phases of program development. Get ready to start an amazing journey of meeting other educators from around the world, exploring awesome landscapes and creations, and gradually incorporating different aspects of VWs into your teaching toolkit as you prepare your students for the workplace of tomorrow.