

# Chapter 4

## Use of Virtual Learning Environments in Distance Education

### Introduction

It is the first day of EMS 731 (Fundamentals of Research in Science Education). Students enter the classroom and greet each other with waves and hugs. They ask one another how their winter breaks were and tell stories of their holidays. Each mentions that the break was too short, but they are ready to get back into the swing of school. After a few minutes of chitchat, Dr. Smith walks in and the class starts. He shows a PowerPoint presentation on different research methods they will be discussing this term. In addition, he goes over the major assignments in the class, spending the most time on the poster presentation that will be due at the end of the semester. Each week the students meet and discuss various reading from the class Web site. On the last night, they all present their posters to Dr. Smith and their classmates explaining their research design. This may sound like a typical graduate class, but in reality this class was taking place all within a 3D VLE where students interacted using their avatars. Each night the classroom changed depending on the mood of the class from a faraway castle, to the beach, to a traditional classroom. The students were in various states and often the professor was on the road traveling during their class sessions. This is just one of the many examples of distance education courses available today.

In 2001, Serdiukov reported over 70% of all U.S. universities or colleges offer distance education courses. Today the percentages are higher. In addition, many of the traditional higher education courses have an online component associated with them, whether it is simply submitting assignments through e-mail or checking a Web site for class notes or other materials. The Web, and more specifically Web 2.0, has become a central part of education in many places and will continue to become even more so in the coming years. Serdiukov (2001) mentioned how technology has moved from being a support tool to an integral part of education and in many ways has begun to shape and give birth to new forms of education. He uses terminology as example of this change. Earlier courses used to offer *computer-assisted learning*, while today they offer *computer-based* or *Web-based* courses. Today, the Web is the central method for distance education courses, but there are many avenues educators and students can use for delivery of information, including a wide range of

virtual learning environments from a more traditional learning management system to holding class in a 3D virtual world (e.g., *Second Life*®).

What are virtual learning environments? Virtual learning environments are simply software programs or systems designed to assist teaching and learning in an educational setting. Some of the more commonly used virtual learning environments are learning management systems (LMS) or course management systems (CMS) (e.g., *Blackboard*® and *Moodle*®) that place a collection of tools in one software program for the instructor and/or student to use. Tools include grade books, online quiz makers, calendars, forums, etc. But a virtual learning environment also can be a virtual world or online game, in which students attend class or do work.

## Creating an “Ideal” Online Distance Education Course

In order to determine the best delivery method for a course, it helps to determine what an “ideal” online course is. According to Carr-Chellman and Duchastel (2000) there are six key components:

- A study guide
- No online textbook
- Assignments
- Examples online
- Course communications
- Interactive skill building

The study guide should be the student’s main reference to course content, structure, and activities. The study guide should include information traditionally found in a syllabus (e.g., course aims and learning objectives), additional learning resources (e.g., textbooks, book chapters, journal articles, and Web sites), assignments and projects, and finally assessment criteria. The main difference between a study guide and a traditional syllabus is the level of detail provided. A study guide should be a stand-alone document about which students should not have additional questions to clarify any part of the content. This will help move a traditional course toward a more student-centered and activity-based learning environment, which is more appropriate for distance education.

Online courses generally should not have the primary learning resources online. Although Carr-Chellman and Duchastel (2000) suggested this, students may feel differently. Many successful online courses provide the primary reading materials online in the form of electronic journal articles and PDFs, which in many cases saves students a significant amount of money with rising textbook costs. Textbook costs have risen over 6% in the past 3 years (Falchi, 2007). Used textbooks may appear to offer discounts, but also are the reason for higher prices on new textbooks. Publishers try to compensate for the loss of revenue from the sale of used textbooks by increasing the cost of new ones. Seventy percent of the revenue generated from

textbooks comes from the first year of sales. Digitized versions of textbooks are widely available from publishers, but are not widely used or promoted by bookstores and instructors. These digitized textbooks would be a good alternative for distance education to help reduce the cost and offer a good secondary source of information for the course. Being able to download the textbook would also make the book available almost immediately and save the student from having to wait for a textbook to be shipped to them. Carr-Chellman and Duchastel’s (2000) reasoning against no online textbooks was that computer screens offer a poor interface for reading, but the quality of computer monitors has advanced in the past 8 years as well as the software programs in which these documents are displayed. In addition, people often have the option to print the materials and read them as hard copies, which in many cases is still cheaper than most textbooks. Carr-Chellman and Duchastel’s (2000) other complaint was concerning the portability of online documents versus a traditional textbook. However, many students today have laptops that are used in classes, and if the textbook or select text is printed out this is not an issue. Another alternative is having textbooks available on ubiquitous computing devices (e.g., iPods, PDAs, and cell phones). Of course all students are not this fortunate, so portability may still be a factor in some cases. Carr-Chellman and Duchastel (2000) also mention that one of the benefits to online documents is the availability of new research or materials that have not yet made it into a textbook, printed, or e-textbook.

Student tasks should be the center of an online course. They constitute the learning experiences in which the students will engage. Student tasks can be designed to be independent or collaborative assignments just as in a traditional course. The goal is to help the student master the learning objectives of the course through these assignments. Preferably, this would switch the major acquisition of information from lectures to the application and use of information in real-world settings. There should be a level of authenticity and a focus on searching for relevant information to the student’s own learning goals in these tasks. Both of these components will help keep students engaged with the subject matter. One final and important element related to students’ task is prompt feedback from the instructor, which will help refine their learning experience as well as correct any developing misconceptions.

Online examples should accompany the student tasks. Examples help to clarify and communicate to the student the level of effort required for an assignment as well as the standard quality of work that the instructor expects. Examples should cover a range of levels to demonstrate both acceptable and unacceptable work. It is important though to maintain anonymity of the examples. Current students can be encouraged to post their assignments online to share with their peers as another method of online examples. This allows for a more open nature to the course and encourages students to collaborate, but could also discourage students who prefer a more competitive way of learning.

Interactive communication is the key to any distance education program. Communication exhibits three different patterns: student–content interaction, student–student interaction, and student–instructor interaction (Moore & Kearsley,

1996). Although we will discuss this more in depth in Chapter 7, we will briefly define them here. Student–student interaction is encouraged because it is believed to make the course feasible for larger numbers of students by reducing the emphasis on student–instructor interaction. Student–student interaction is normally encouraged through asynchronous discussions in online forums. Online forum discussions allow for intellectual discussion to occur that is profitable to all. Asynchronous discussions allow for students to participate in a flexible manner. There are two other methods of communication also valuable to distance education – synchronous communication through chat rooms or Voice over Internet Protocol (Voice over IP) and e-mail communication.

Synchronous communication is real-time conversation. This form of communication is beneficial for a number of reasons. Instead of students reading lecture notes from a Web site, they can participate in an actual lecture, which allows for questions to be asked and comments made or clarified. Students working on group projects can hold sessions to discuss, plan, and assemble their project instead of relying on e-mail or other methods of communication, which could slow down the process. Many chat programs that are available for free on the Internet, such as MSN Web Messenger®, allow for the exchange of documents to individuals or the group in the chat session making group collaboration easier and efficient. Synchronous communication can also be in the form of videoconferencing.

Many informal educational institutions like museums and science centers are starting to offer distance education programs or courses for schools. These types of programs offer an inexpensive alternative to field trips. These programs use VoIP technology which requires special equipment on both ends, making this type of technology not as feasible for traditional distance education. As a cheaper and better alternative to the Internet, software like *Elluminate*® or Adobe Connect® allows for videoconferencing with no special equipment other than a Web camera. Many of these programs also allow document sharing and whiteboard technologies for sharing ideas and work. Synchronous communication can make students feel like they are in a traditional classroom while sitting at home. For working individuals or individuals with families, it isn't always easy to attend class at a certain time each day or week, making non-synchronous courses more popular for these students. However, we must reiterate the price of learning, or lack thereof, for these students (Annetta & Shymansky, 2006).

E-mail communication is the final form of communication used in distance education. This is probably the most common method of communication between instructors and students. This allows for private communication concerning grades, assignments, and progress. E-mail is also beneficial for administrative communication that is important to be received in a timely manner or in an emergency. Most individuals check their e-mail more often than they check the course Web site, meaning they may miss an important announcement if it was only posted on the course Web site. Many learning management systems have a messaging or e-mail tool built into them, but unless there is the ability to forward them to an instructor's or student's traditional e-mail address, checking the course Web site frequently is still an

issue. E-mail is also commonly used, as mentioned earlier, on collaborative group projects to exchange information.

Interactive skill building is the last key component Carr-Chellman and Duchastel (2000) recommend. The software technologies used for interactive skill building have come a long way since Carr-Chellman and Duchastel's (2000) article was published. Java and other computer applications today allow students to have real-time interactions in distance education that they might find in a traditional science lab or computer lab. These types of applications allow for a narrower learning experience that is important for building certain skills. Through these types of applications, students can participate in dissection, observe chemical reactions, or play the stock market.

Finally, distance education has two instructional facets that should be addressed: engagement and adaptiveness (Carr-Chellman & Duchastel, 2000). Engagement is concerned with keeping students' interest in the information and social setting involvement, while adaptiveness is concerned with the availability of information (i.e., having the right information at the right time). All of these components make up just one part of an ideal course. Other instructors or students may have vastly different ideas as pointed out with synchronous versus asynchronous communication or the use of textbooks versus online materials. As technology continues to advance and improve, the "ideal" distance education course also will continue to change, but some components (e.g., the study guide) will stay the same. Now that we have a better idea of what an "ideal" distance education course involves, let us take a closer look at some of the different types of virtual learning environments that could be used.

## Learning Management Systems

The most common form of Web-based distance education currently takes place in a learning management system or course management system; WebCT<sup>®</sup> and BlackBoard<sup>®</sup> are two of the more commonly used LMS on the market. After the companies merged, they covered over 75% of the LMS market (Mullin, 2005). LMS and CMS are basically the same – the only difference being the manufacturer's classification preference. Sometimes LMSs are considered to be predominately used for corporate training programs in the United States, while CMSs are used for higher education; however, the terms are often interchangeable. The decision to choose a particular product depends more upon the tools, the overall friendliness of the environment, and the tech support that the program offers. Learning management systems are designed to help organize and manage course content and learners. Unfortunately, LMSs don't always consider the needs of the faculty or learner (Siemens, 2006). In most cases, the actual learning experience takes a backseat to the management functions of the software. There is limited research that has been done on students' experiences and efficacy of the LMS tools. Most LMSs promote asynchronous learning rather than synchronous with the use of forums and e-mail

as the most common forms of communication between students and the instructor. The level of the instructor's and students' knowledge of the particular LMS being used can greatly influence the learning environment for the students. Siemens (2006) comments that "the 'management' aspect of a learning management system creates another problem: much like we used to measure 'bums in seats' for program success, we now see statistics of 'students enrolled in our LMS' and 'number of page views by students' as an indication of success/progress (p.5)." He says that the underlying assumption by administration is that if the students are exposed to the content, learning will happen, which isn't always the case.

Let us compare a course offered at North Carolina State University via BlackBoard® to Carr-Chellman and Duchastel's (2000) "ideal" distance education course components. The study guide for the course was split over several different documents in several different locations in the LMS, creating confusion about where to find information. A traditional course syllabus was easy to find and had the majority of the information the student needed, but assignment descriptions, due dates, and final project information were all found in different locations. In this case there was a problem associated with not having a physical textbook, but instead using the units within the LMS. This created a problem when the server was down for problems or maintenance, which occurred several times throughout the semester. Another problem was the ability to look at multiple sections of the LMS at one time. For example, if the student was working on a forum assignment, he/she could not have the forum and the assignment description, and text from which the assignment or discussion was coming open at the same time. He or she could have the forum and one other window open, which for some assignments required the student to do a lot of flipping back and forth between virtual pages of text. If for some reason the student accidentally closed the forum page where they were typing the assignment, they lost all their work. So in this case it would be beneficial to have a textbook or printed material, if possible, in this particular LMS.

The assignments included forum discussions where students were asked to comment, give real-life examples, or answer questions related to the material that was covered in each section of the course. In some cases, the students did not have real-life experiences in the subject discussed and therefore felt uncomfortable doing the assignment. In this particular course, the title and description made it sound as if it were an introductory course with no experience needed, yet in some of the assignments it assumed the students had real-life experiences. For example, it asked the students to relate some of the teaching issues they had experienced as an educator. Some of the students had never taught, so the instructor asked them to relate experiences they had encountered as a student. Other assignments included student reflections, students being asked to interview others, and a final project. For online examples of the assignments, the instructors had the students briefly summarize their current work in the forums for the rest of the class. They also included examples of past final projects, but forgot the importance of anonymity; however, this wasn't too much of a problem in this case. All were examples of excellent final projects and access to the LMS was limited only to the students in the course. Course communication was limited to asynchronous forum discussions and e-mails. The instructor

encouraged students to post questions or problems in the forums so that all could see, but the delay in response to the question or concern was often much longer than if the instructor had been directly e-mailed, in some cases the delay was several days. The advantage to posting a question or problem in the forums is that students could often help each other. Finally, interactive skill building was used in some of the assignments and the final project.

Some of the other issues that arose with the use of the LMS included no drop box for homework assignments, minimum interaction between faculty and students, and general lack of understanding on where to find information for the course. Grades in the grade book consisted only of the points given for forum discussion, but not the actual assignments that were submitted to the instructor, which were located in another tool associated with assignments.

The faculty and many of the students were new to BlackBoard®, which may have contributed to over half the class dropping the course.

There are pros and cons to this type of virtual learning environment. In one central location students can work at their own pace with little guidance and have all the information they need for the course, while faculty can handle grades, manage groups, and post class announcements. One of the main disadvantages with an LMS can be the lack of instructor interaction, which is instructor-dependent. In this particular case, the instructors often checked the forums once or twice a week, while students may post questions for the instructors daily. Whereas in a normal classroom, the students could get many of their questions answered before or after class if not during the class period. In the end, the students often ended up answering each other's questions before the instructor replied. This is not meant to criticize the course, but to demonstrate some of the potential problems associated with an LMS especially from the student's perspective. Many of the problems were corrected as the instructors became more comfortable with the LMS. This case simply demonstrates the need for proper training and support for faculty teaching in distance education. There are many courses offered through corporate training centers, community colleges, universities, and other institutions using learning management systems that do not have these problems as in the case of Rio Salado College.

Rio Salado College in Tempe, Arizona, has had a distance education program since 1978 using correspondence and telecourses (Scarafiotti, 2003). This community college was an early adopter for using the Internet for distance education, which helped enrollments surge from 10% of the total college full-time enrollment equivalents (FTEE) in distance education in 1995 to 48% of the total FTEE in 2003. This approach allows Rio Salado College to offer courses and programs for both individual students and organizations or institutions, such as the U.S. Army, that send students to Rio Salado College's online program. Unlike most higher education institutes Rio Salado College offers online courses every two weeks instead of once a semester and students can complete the 14-week courses early with faculty permission to speed up their time to complete their program. This may seem like a lot of work for faculty, but in reality the college has adopted a "one course, multiple sections" policy where a complete master course is designed for the faculty, most of whom are adjunct instructors. This allows for consistent course content and

guarantees online courses will contain navigation that is functionally predictable and consistent. This is just one example of the successes of the Internet in distance education and some of the benefits that distance education can offer an institution by increasing enrollment and benefit the student by creating flexibility not offered in many traditional courses.

LMS systems were originally designed for distance education, but are becoming more popular for use in blended learning environment, which eliminates the problem of minimum interaction between instructor and student. Blended learning environments are becoming more commonly used in courses. LMSs are being used with more traditional on-campus classes for the submission of assignments, posting of class announcements, posting to forums to continue discussions started in the classroom, or start new ones or for viewing grades through the grade book tool, etc.

K-12 schools are also joining the ranks of blended learning environments. Many public and private schools are hardwired, allowing teachers and students access to various educational Web sites. In addition, many teachers now have Web sites for their classes giving students information on homework assignments and projects, class announcements, and a class calendar. This is also a place where parents can go to see what is happening in their child's classroom. Using Web sites in this manner and hardwiring our schools create a better communication dynamic between the teachers, students, and parents as this has the potential to improve the overall learning environment.

## **Alternatives to LMS**

Two alternatives to LMSs are personal learning environments (PLE) and social software. PLEs are designed to address some of the limitations of an LMS by allowing individuals to take control and manage their own learning with a more contextually appropriate toolset so that at the same time, there is reduced structure in management and implementation of learning (Siemens, 2006). One of the main differences between a PLE and LMS is that a PLE is a concept for e-learning and not a product where LMSs are a product (Wilson, 2007). Ongoing research is being conducted at several universities around the world on PLS. Social software is often used as some of the tools for PLEs (Siemens, 2006). Social software includes blogs, wikis, social bookmarking sites (BlogMark.net, de.lirio.us), social networking sites or affinity spaces (MySpace©, FaceBook©), podcasts and video cast tools (You Tube©), search engines, e-mail, and Voice over IP. The one problem with these types of tools is the lack of integration and the control required by many universities (Siemens, 2006). Integration is becoming less of an issue as many of these sites allow users to link information from other types of sites like videos from You Tube©. There are several educational blogging and wiki sites today that allow users to post bookmarks to other Web sites, videos from a number of different sources, podcasts, etc., using the blog or wiki site as the way to connect all these

tools together for better management making these types of sites more of a possible alternative to LMS.

## Educational Games and Virtual Worlds

Looking at the different types of virtual learning environments, learning management systems were considered the way to use the power of the Internet in the 1990s and 2000s. What will be the choice of the future? The Horizon Project in 2007 identified two possible alternatives – virtual worlds and Massive Multiplayer Educational Gaming (MMEG; New Media Consortium & EDUCAUSE Learning Initiative, 2007). The Horizon Project started in March 2002 and is still ongoing. This project seeks to identify and describe emerging technologies that are likely to have a large impact on teaching and learning in higher education. The 2007 *Horizon Report* identified six trends in technology. They predicted a significant impact on higher education in the next 1 to 5 years (Appel, 2007; New Media Consortium & EDUCAUSE Learning Initiative, 2007).

The six trends identified were as follows:

- User-created Content
- Social Networking
- Mobile Phones
- Virtual Worlds
- New Scholarship and Emerging Forms of Publication
- Massive Multiplayer Educational Gaming

The 2006 *Horizon Report* included educational games as one of the trends, which included both Massive Multiplayer Educational Gaming and virtual worlds (New Media Consortium & EDUCAUSE Learning Initiative, 2007). We will refer to virtual worlds as 3D VLES. Many of the trends and tools listed relate the idea of personal learning environments. User-created content incorporates blogs, wikis, and on-line photo sharing sites. Social networking sites include MySpace© and FaceBook©. Today, cell phones allow individuals to access the Internet, chat, and download podcasts or videos making the educational opportunities almost limitless. The new scholarship and emerging forms of publications include blogs, wikis, and other document sharing or open comment types of sites. Authors may choose to write in a blog or wiki to get immediate feedback from other professionals or readers to help make changes along the way rather than at the end. These types of tools allow for easier collaboration for groups of individuals who may not even know or be located near one another. Many of the technologies listed can be applied to distance education. In this chapter we will mainly focus on the virtual worlds and Massive Multiplayer Educational Gaming (MMEG) even though many of the other trends can be associated with these two types of environments.

Why would virtual worlds or Massive Multiplayer Gaming even be considered for educational purposes? In *A Field Guide to Educational Simulations* Aldrich (2002) states

The next generation of learners, roughly those age thirty and younger, have grown up playing computer games. These once and future learners have learned how to learn through interactions with computers. They expect to be engaged on multiple levels simultaneously, in a fast feedback, graphical, high stimulation, extremely immersive user-centric environment. As a result they're utterly bored in traditional classrooms (p. 1).

Research has been done for years on the advantages and disadvantages of using video games in education. One conclusion upon which most researchers agree is that players learn something from video games (Shaffer, Squire, Halverson, & Gee, 2005). The negative arguments in many cases are the same as any new form of entertainment technology. Many of the same arguments were used against talking movies and TV in educational settings (Squire, 2003). It is a matter of use in moderation and in an appropriate manner. One of the main things about 3D VLES and MMEGs that will benefit education is that they allow the players to experience the technology firsthand. As Gee (2005) points out, much of success in school is based on being able to understand complex academic language like vocabulary found in textbooks. When students only understand the verbal language, they may be able to interchange words into their own definitions and pass written exams, but they cannot use it in real-world problem solving. 3D VLES allows students to experience problems for themselves and apply them in trial and error methods to the world around them. These worlds can be used to experience anything from the effects of gravity to triaging patients in an emergency room.

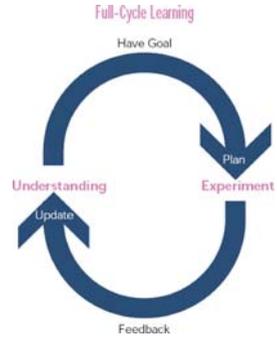
Gee (2005, p. 20) listed six reasons for explaining that video games are good for learning:

1. They can create an embodied empathy for a complex system.
2. They are action- and goal-directed preparations for, and simulations of, embodied experience.
3. They involve distributed intelligence via the creation of smart tools.
4. They create opportunities for cross-functional affiliation.
5. They allow meaning to be situated.
6. They can be open-ended, allowing for goals and projects that meld the personal and social.

He warned that video games do not necessarily do all these things by themselves, but it depends on how they are used and the learning systems of which they are a part.

Educational simulations have been used for years in schools. Many of these are scientific simulations where the student watches the monitor from an outside role as an observer. 3D VLES and MMEGs are also simulations, but instead of being an outside observer the student is part of the simulation, allowing them to explore, discover, and create goals of their own within the simulation (Gee, 2005). Industries,

**Fig. 4.1** Full-cycle learning model (Aldrich, 2002)



governmental agencies (e.g., U.S. Army, NASA), and commercial airlines have successfully used first-person simulations to train their personnel. These types of simulations use full-cycle learning whereby the student understands a system, has a goal, receives feedback, and updates their knowledge (Fig. 4.1) (Aldrich, 2002; Gee, 2005).

Simulations are best used according to Aldrich (2002) in three situations.

1. Simulations can be used for developing ideas and concepts that which only experience can strengthen its understanding.
2. Simulations are good for giving people practice in decision-making before they are faced with real-life situations that can be dangerous or critical, or for issues that deal with time or scale.
3. Simulations allow people to experience a time or place that they are unlikely to experience directly.

3D VLES and MMEGS incorporate all of these types of simulations allowing limitless possibilities for distance education.

In their report, the New Media Consortium and EDUCAUSE Learning Initiative (2007) stated 3D VLES are a trend that would not come about for 2 to 3 years, but many courses are already starting to use them. 3D VLES can be applicable to almost all disciplines because they are generalized rather than contextual (New Media Consortium & EDUCAUSE Learning Initiative, 2007). Settings can be created that pertain to any subject or area of interest. Issues with scale in real life can be handled by virtual environments allowing students to visualize physical objects that normally occur at cosmic or nanoscales. Virtual worlds also allow for social interaction, which can be beneficial for role-playing and scenario-building, allowing students to go the extra step to assume the role or responsibilities of a paramedic, architect, or biologist without having to worry about real-world consequences.

3D VLES can be either public or private allowing for students to interact with any number or types of individuals. Second Life© is a public virtual world that many universities use for classes. Students in Second Life© can interact with a number of other users from different universities and institutions as well as their own

classes. Some classes choose to do projects observing and/or interviewing the public members of the world, while other programs like *Active Worlds*® allow institutions to buy private worlds or participate in public ones.

Multiplayer educational gaming offers many of the same benefits as 3D VLES and vice versa because MMEGs are developed in 3D VLES. One of the main differences is some virtual worlds can be experienced as an individual without coming into contact with other people. MMEGs are designed for people to interact with one another on some level. Because it is a game, there are storylines and goals already set for the player before even entering the world, whereas virtual worlds can rely more upon the goals of the individual and/or class. MMEGs normally do not allow students to create objects nor do MMEGs allow students to develop land. Students can accomplish these actions in 3D VLES.

One of the main benefits to multiplayer educational gaming is the way it better engages learners (New Media Consortium & EDUCAUSE Learning Initiative, 2007). Massively Multiplayer Online (MMO) games have attracted and retained over 16 million people worldwide (Fig. 4.2) (Woodcock, 2008). These types of games also allow for both discovery-based and goal-oriented learning. Development of teambuilding skills is probably one of the biggest benefits to MMOs. The designed activities of MMOs cannot be completed by a single player, requiring individuals to work together as a team. The group must strategize, develop a solution maximizing their various talents, and execute the plan to succeed. The group can be from 2 to over 40 people allowing for a variety in teambuilding experiences. In addition to teambuilding skills, MMOs allow people to develop leadership, communication, and management skills. More experienced members can also take on a tutoring or mentorship role to newer members and share their experiences and

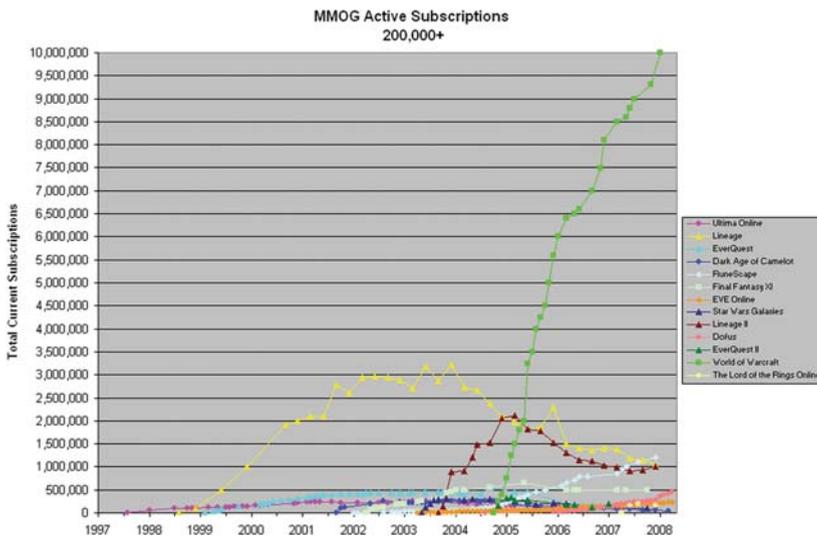


Fig. 4.2 MMOG active subscriptions 1997–2008 (Woodcock, 2008)

knowledge. Teambuilding is seen as a critical skill by most hiring agencies of college graduates

## Learning from Massively Multiplayer Online Role-Playing Games

Before delving too far into multiplayer educational gaming, let's look a little closer at one of the most popular Massively Multiplayer Online Role-Playing Games currently on the market, *World of Warcraft*® Online (WoW), and the educational benefits it offers players. Currently, over 10 million people around the world play WoW (Woodcock, 2008). WoW is a fantasy-based game with most of its storylines coming from previously released single-player computer games based in the world of Azeroth. Players create a character from one of nine races (e.g., Night Elf, Undead, Tauren, Human, etc.) and choose to play one of 10 classes (e.g., Mage, Warlock, Warrior, Priest, etc.) to play. After personalizing the characters' appearance, players join the game at level 1, where they must learn skills and professions that will help them progress to level 80. As players move through the game, they interact with other players through casual conversation in chat channels, joining together for quests, instances,<sup>1</sup> battlegrounds, or raids,<sup>2</sup> and interacting through buying and selling materials and goods. Players in WoW earn and spend money just like people in the real world, except their currency is gold, silver, and copper.

Although, this game was designed for entertainment purposes, it can teach economics, math, science, as well as teambuilding skills (Gee, 2005; New Media Consortium & EDUCAUSE Learning Initiative, 2007), leadership skills (New Media Consortium & EDUCAUSE Learning Initiative, 2007; Yee, 2003), and social skills.

Supply and demand is demonstrated in WoW just as it is in real-life situations. Items can be sold at an auction house to other players or on trade chat channels. Rare or harder to find items are sold for hundreds or thousands of gold, whereas common items that are easily acquired may be sold for a few copper. Prices increase or decrease in response to the level of demand. A common item like "netherweave cloth" (sold in stacks of 20), used for many skills (e.g., making bandages for first aid) and professions (e.g., tailors use it to make many types of armor), normally sells for 4 gold, but may be sold for 8 gold if there are only a few currently on the auction house. However when the auction house is overrun with this item, it may go for half its normal price, or 2 gold.

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<sup>1</sup>Instances – Dungeons designed so that each group of players has their own version of that particular dungeon. Normally, they are designed for 5–40 players, depending on the particular dungeon (Blizzard Entertainment, 2008).

<sup>2</sup>Raids – Large scale attack by a group of people on an area (e.g., dungeon or town) (Blizzard Entertainment, 2008).

This is similar to looking for sales in the real world, as some players even monitor the auction house on a regular basis, not unlike people do on EBay©. Players know what the normal prices of common goods are and wait for periods when the auction house is overrun with these goods, or when a player is desperate to sell and places an item at an extremely low price. These players then buy the goods and wait for a later date to sell them at a profit, much like stock market brokers. Players that truly know the market are able to make lots of gold simply by buying and selling items at the auction house. As in the real world, WoW currency holds power.

The game encourages a player to work individually as well as part of a team (Fig. 4.3). Most players' quests can be done on their own, allowing them to learn how to play their classes and develop their own skills as players, but there are a variety of times when players are required to work as a team, as in the cases of raids or battlegrounds. These group environments require the team to work together by developing strategies on how to conquer obstacles in their way. The 2007 *Horizon Report* says in MMEGs that it is possible to design certain activities that cannot be completed alone, so "a group must work together to strategize, develop a solution, maximize the various talents of the team members, and execute their plan in concert to succeed" (New Media Consortium & EDUCAUSE Learning Initiative, 2007, p. 26). This is demonstrated in WoW when players assume certain roles on a team and either do not perform their role correctly or try to act as individuals. As a result, the



Fig. 4.3 Example of 25 individuals working together to bring down Illidan in Black Temple

team will fail. Groups may consist of only a couple of people or up to 40 people working together simultaneously.

WoW also teaches players how to adjust strategies as needed. A strategy may work for one group of characters, but when group dynamics change, it may not work the same way, causing players to learn how to adapt. This is the case in battlegrounds where players are competing against other players to take over their respective bases. Each battleground is unique with different types of characters played by individual players. This teaches the players to work together as a team through communication with one another. When communication fails, there is no organization or strategy and, thus, the group fails. The team with the best communication and ability to work together is the group that usually wins. Communication can become a problem when groups of individuals who know each other, and how each other operates, decide to stay together as a team through these instances, raids, and battlegrounds instead of grouping with random people they don't know.

Along with teambuilding skills, come leadership skills. As in any group situation, some people are leaders and some are followers. WoW allows anyone to become a leader. It is up to the player if he or she wants to put in the effort to become a leader, whether it is acting as a mentor to other players with less experience, being a guild leader or officer, or running a raid as a raid leader. Leaders often make decisions that others don't want to make, such as kicking out a member from a guild, battle

Cast Cycle	Average DPS		Projected Total Damage		Approx. Time Unst OOM (sec)		DPS Rating					
	Current	Saved	Current	Saved	Current	Saved	int	sp	ht	crit	haste	mp
MF SPx3 W	1546.8	1524.6	558,304	548,847	Not During Fight	Not During Fight	0.93	0.98	1.06	1.00	1.00	0.98
IS MP SPx3	1545.7	1515.3	556,483	545,504	Not During Fight	Not During Fight	0.93	0.98	0.98	0.99	1.01	1.00
Stamina Only	1417.9	1393.8	510,447	501,764	Not During Fight	Not During Fight	0.93	0.99	0.98	1.00	1.01	1.00
MP W/rauth	1251.3	1229.5	450,456	437,808	Sim 30s	Sim 30s	0.93	0.98	0.98	0.99	1.00	0.98
IS SPx4	1514.0	1489.6	545,029	535,167	Not During Fight	Not During Fight	0.93	0.98	0.98	1.00	1.01	0.98
IS MP W/rauth	1280.5	1224.4	480,997	478,227	Sim 30s	Sim 40s	0.91	0.97	0.99	0.97	1.00	0.97
IS SPx3 W	1482.8	1458.1	523,798	514,517	Not During Fight	Not During Fight	0.93	0.98	0.97	1.00	1.00	0.97
W/rauth Only	1323.3	1347.6	476,377	485,192	Sim 5s	Not During Fight	0.98	0.96	0.96	0.99	0.96	1.00
IS W/rauth	1320.9	1330.1	482,376	478,818	Not During Fight	Not During Fight	0.97	0.96	0.95	0.99	0.95	1.00
MPx2 SPx3	1686.2	1656.3	579,692	569,266	Not During Fight	Not During Fight	0.93	0.98	0.98	1.00	1.01	0.98

Projected Character Sheet (As buffed)		QuickAdd
Current	Saved	
Stamina	593	550
Intellect	577	574
Spirit	553	565
Spell Crit (%)	24.64%	25.69%
Spell Hit (%)	17.09%	20.61%
Arcane Damage	1579	1634
Nature Damage	1579	1634
Mana per 6 sec	304	316
Haste (Rating)	123	44

Fig. 4.4 Moonkin DPS spreadsheet (FileFront, 2008)

resurrecting an individual during a fight, or giving away a trade secret to another player in order to help them. Yee (2003) specifically looked at four leadership skills: mediation, persuasion, motivation, and leadership. His goal was to see if players felt they had improved their knowledge or ability in certain skills in MMORPGs. Out of 2,804 people sampled, over half felt they had learned a little or a lot in mediation (55.2%) and leadership (50.3%) and just under half felt they learned a little or a lot in persuasion (43.8%) and motivation (48.4%). In an environment like WoW, mistakes will be made without any real life consequences, giving individuals a chance to learn and explore their leadership skills. In the end, these players will learn skills they can apply to real-life situations, like how to research strategies for certain situations or delegate responsibilities to members of a team.

In many cases, social skills coincide with the teambuilding and leadership skills, but there is more. The game world has its own rules of acceptable behavior that players are expected to follow or they will face consequences. For example, players working together as a team have the possibility to earn gear or items they need to advance. Normally, it is worked out among the players who will get what gear by determining who has the ability to use an item, or the items are distributed fairly to be sold. But in some cases, players take an item without permission which is considered being a “ninja” or a thief. This unacceptable behavior is often broadcast in public chat channels or players ignore this person and tell others not to interact with him or her. Eventually, the person either learns to work as part of the team when dividing loot or becomes a social outcast unable to become part of a group. After all, people don’t want to group with someone they can’t trust.

There is also the social atmosphere of a guild. A guild is a group of individuals that work together and want to spend time together. The most successful guilds often have strict recruiting practices requiring people to apply and interview before they are invited to join. Most applications and interviews aren’t as rigorous as applying for a job, but they are expected to be taken seriously. Once a person is invited to join, he or she is often given a trial period to see if he or she fits in with other members of the guild. Guilds usually have some level of hierarchy with requirements for players to be promoted to a higher level. For example, a person who demonstrates leadership skills and the ability to work well with other players may be promoted to an officer position, while someone with the ability to read other players and a salesman attitude may be made a recruiter for a guild.

There are players who take learning the game to the next level. Excel© spreadsheets (Fig. 4.3) have been designed for the 10 different classes in the game for players to input their characters statistics to obtain information on how much adding a point or more to a certain skill category (e.g., intelligence, spell hit, spell damage, etc.) will increase their damage per second. These players know how to calculate a variety of statistics about their classes to get the most out of their characters. For example, they know which pieces of armor will benefit them over others and exactly how that specific pieces of armor will change their abilities. They plot charts using any number of record-keeping programs to be able to compare their characters to others in order to see their progress compared to the other players. Raid and guild leaders will use this information to put together their team for raids or battlegrounds

much like a coach picking players for a sports team. Players also learn how to do research outside the game, reading strategies for certain bosses, watching videos, and spending time on sites that help them determine the gear their characters need to improve their skills.

Players learn how to think strategically and analytically, solve problems, plan and execute tasks as an individual and as part of a team, make decisions, and adapt to a rapidly changing environment. The amount a player can learn from a game like *World of Warcraft*® depends on the individual and how much he or she wants to put into the experience. If players can learn all these skills from a game designed for entertainment, how much can students learn from one designed for education? The short answer is that a student will get out of it what he or she put into it, much like players of *WoW*.

## Using 3D VLES in Distance Education

How does all of this apply to distance education? 3D Virtual Learning Environments can and have been used as a meeting place for distance education courses. This is probably the simplest way to use a 3D VLE, but it is not the only way it can be used. Virtual worlds can be designed for anything instructors need. A class in Shakespearean literature could be held in a traditional Elizabethan theatre where students act out the plays, bringing a richer experience than simply just reading plays. Many schools and businesses use premade environments, meaning there are some buildings and objects already created (e.g., *Second Life*®) to reduce the staff's initial development workload.

*Second Life*® has been used for a number of educational purposes: as classrooms and laboratories, and environments to practice/test various skills. Social scientists including anthropologists, sociologists, and psychologists use *Second Life*® as a laboratory for studying people. They find the interaction of avatars an intriguing subject (Foster, 2005). Researchers have found that many of the connections and tensions that develop among avatars speak volumes about the behavior of people and organizations in real life. Specific research has been done on issues regarding marriage, gender identity, social status, and religion. A professor at Elon College says she “can get her student to understand in five minutes what I would normally have to lecture for about five hours” by using *Second Life*® (Foster, 2005, p. A36).

Business professors use *Second Life*® as a virtual economy to study the effects of economic decisions on the real world. Users can create, buy, and sell a variety of goods in this 3D VLE for “Linden dollars,” which can be exchanged for real money (Foster, 2005). So, students can study economics, advertising, real estate, entrepreneurship, and many other business interests and skills.

Architecture students use this virtual world to create buildings, public places, or experiment in urban design. Computer science students can also use this world to study game design and familiarize themselves with the different tools used to create

objects in this virtual world. Medical students at the University of Kansas use a Second Life© medical clinic to practice patient encounter strategies (Childress & Braswell, 2006). The possibilities of using virtual worlds to teach are only limited by the instructor's imagination.

In one particular case, a distance education course that originally used the LMS Blackboard© for the delivery of its content decided to utilize Second Life© as a method of creating a stronger sense of community among the students and improving communication between the instructor and students (Childress & Braswell, 2006). The instructor wanted to engage students online in an environment that allowed them to become more involved with both the instructor and other students. Chat rooms have been used before to also try to foster this sense of community, but they offer no visual component like a 3D VLE. Students and instructors can watch how other members interact with each other and objects found in the environment which enhances the experience. In this particular case, the instructor designed a three-story building with living quarters, offices, a lounge, a library, a deck with video equipment for watching movies, and a rooftop lounge for larger groups to get together. Initially, this building was only used for virtual office hours, orientation to Second Life© and socializing, but according to class comment cards also worked to create a better sense of community and communication in the class. In the next step of this course, the instructors planned to integrate more instructional tools, class activities, and cooperative learning experience into the environment (Childress & Braswell, 2006).

3D VLES and MMEGs fit well with personal learning environments. A building in Second Life© can allow students to leave messages for teachers and other students and have resources available such as documents, links to Web sites, and videos. It can also serve as a meeting place for live discussion instead of threaded text in the forums or a place for students to work on a project together. MMEGs and virtual worlds can even allow students from different sections of the same class to work, discuss, and study together as they choose in order to maximize their learning experience.

## Creating a Learning Culture

Researchers are interested in more than just the learning that comes directly from the 3D VLE and MMEG experience; they are interested in the culture that develops around them. Gee (2005) describes how people in these MMORPGs (e.g., *World of Warcraft*©, *EverQuest*©, *Lineage*©, and *Guild Wars*©) are creating new ways to build and share knowledge. They are developing new forms of learning communities both online and in real life. It is possible for educators to use these games as models for classrooms and workplaces of the future (Gee, 2005). One example is the groups people form within these environments. Guilds are groups of people who play and help each other. They take responsibility for one another by helping each other improve, work together as a team, and even punishing one another for

unacceptable conduct. Think how this could be applied to education. Would students who learned to work together and trust one another help students who are falling behind keep up for the good of the group? Would there be less discipline problems because they do not want to let their team down? These concepts are yet to be explored. Researchers want to know how these communities of learning are formed around these environments. Studies have shown that video games, whether single-player or MMOG, have robust game-playing communities associated with them (Shaffer et al., 2005). Schools sequester students in many ways from one another and from the outside world, while games and 3D VLEs bring people together both competitively and cooperatively. Schools encourage students to work primarily alone using school-sanctioned materials, while avid gamers participate in forums, seek out new information, read and write Frequently Asked Questions (FAQs), and learn to become critical consumers of the information available. Shaffer et al. (2005, p. 106) stated

Classroom work rarely has an impact outside the classroom; its only real audience is the teacher. Game players, in contrast, develop reputations in online communities, cultivate audiences by contributing to discussion forums, and occasionally even take up careers as professional gamers, traders of commodities, or game-designers.

Imagine if these types of communities could be formed around different aspects of education.

## **Future Research Needed on 3D VLEs**

Research needs to continue on these communities and experts must explore how to develop them in education. By adopting these potentially new strategies, we are changing education for current students as well as opening up new possibilities for learning. Childress and Braswell (2006) list many areas of research that need to be conducted related in MMOGs including addiction, sense of community, longevity of groups, apprenticeship, role assignment, collaboration and virtual teaching, learning style and game selection, and game-based motivation. Shaffer et al. (2005) pointed out that we need to understand how commercial games create compelling virtual worlds and how inhabiting one of those worlds develops situated knowledge.

Research also needs to continue on different strategies for distance education. What are the benefits of other VLEs like LMS? Which should be used, LMS or PLE, to connect the students to the information they are trying to learn? Should they be used as the main tool for distance education or be combined with other tools like MMEGs and 3D VLEs? How does distance education need to be adapted to account for the variety of different technologies available on the market, but keep it affordable for both students and schools? Research in distance education is still in its early years in many ways, but it is developing rapidly as more programs and courses switch to the ever-growing popularity of distance education.

## Current Issues 3D VLEs Face in Education

What are the current roadblocks to using games in education, distance or otherwise? Many administrators are from a non-video-game-playing generation that does not understand the appeal or benefit of using these types of tools in education (Squire, 2003). The first step in overcoming this roadblock is explaining to administrators and spokespeople for schools the range of learning opportunities that games and 3D VLES present for students (Shaffer et al., 2005). Video games are already being used by corporations, governmental and political groups to convey ideas and to teach facts and world views. Shaffer et al. (2005, p. 110) explains “Schools and school systems must soon follow suit or risk being swept aside.” Other issues inhibiting the use of virtual worlds and MMEGs include not having access to needed technology, cost, and lack of developed programs or games for instructors to use.

Should 3D VLES and MMEGs be used in school or outside of school? We argue for both. They offer a vast realm of possibilities. Both formats can be used to replace labs that are deemed dangerous or hard to recreate in the classroom. They can function as the classrooms. MMEGs can be assigned for homework or as an after-school tutoring session for students who need extra help. MMEGs can be used as a way for all students to study for tests. One of the differences between virtual worlds and MMEGs is interaction with other students, but it doesn’t always have to be an environment for synchronous communication. Students can visit resources, videos, and other links relevant to class information that they might normally find on a course Web page. These tools can be used as additional tools for more traditional online courses, virtual office hours for students and professors to “meet”, a place for students to interact as they like, a place for an individual to find more information, or to run a simulation for something students do not understand in class. Using *Second Life*®, students can study with other individuals for a class project. These tools are already popular with many people outside of education. Instructors could take advantage of this by making *Second Life*® or other virtual environments a continuation of students’ extracurricular lives instead of limiting it specifically to either in-school or after-school use.

Video games are expensive to make, which becomes an issue for education. Students prefer the same level of detail put into educational games as those for entertainment, even though this is not necessary for students to learn from them. Many government agencies (e.g., U.S. Army and NASA) and private corporations that use simulations for training personnel have already found a solution to this problem (Gee, 2005; Shaffer et al., 2005). They have created a flight simulator or military personnel trainer designed for their needs and modified the simulation to create a marketed entertainment version. There is no reason this can’t be done with educational 3D VLE and MMEG, or any educational game, to maintain lower costs. Look at *Second Life*®, for example. Universities and businesses are given free space to use for a semester, while the public buys land for \$5 to \$195 per month depending on the parcel size they want (Linden Research, Inc., 2008). If these 3D VLES or MMEGs work as well at making learning exciting the way researchers expect, there is no reason that students exposed to these environments both inside and outside of

school will not want to spend time immersed in them outside of school. Think of distance education students who meet and work together in a 3D VLE as part of a class. They become friends, but may live hundreds of miles apart or learn that they are taking more of the same courses together that do not use this type of technology and may want to meet to work on homework or study for a test. Medical school students may want to run more scenarios in a virtual hospital that they use for class to practice bedside manners with patients and family members, but they can practice with real people who are suffering from any number of ailments (real or fictitious) without having to worry about real consequences.

Another option for helping to reduce the cost of educational games is through advertisement. Product placements are becoming common in video games (Abelson, 2005). A clean, no advertisement version should be available for use in schools, but advertisements can be added to the version sold for entertainment. Many blogs and wikis do this in order to offer free sites. Teachers may request a site with no advertisement for school use, whereas advertisements are added to the same sites when used by the general public. Costs for advertising in video games can range from \$5,000 to \$500,000. Advertisements can be subtle. For example, an Apple© computer may be used to receive the results of lab work as part of the storyline of the game. A murder victim in the “Law & Order: Justice is Served” game was about to sign a contract with fashion designer Lacoste (Abelson, 2005). Ultimately, access to these virtual worlds and MMEGs needs to be as low cost as possible for teachers to use. The best games proven to give students a good learning experience will not be used if they are not affordable for teachers who are working with small budgets. We will continue to expand on this topic later in this book.

Games encourage exploration, individual expression, and playful experimentation with social boundaries (Shaffer et al., 2005). They have the potential to change education as we know it both in distance education and in traditional education. Many people feel that the lines between a traditional classroom and virtual classroom will continue to blur until the difference is hard to distinguish. Virtual worlds can recreate a sense of community that has been lost in many courses moved from traditional classrooms to online instruction, as well as allowing students to experience things they may never be able to experience in real-life situations.

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