Crossing the Web-3D Divide Using Open Source Tools: Integrating Moodle and Second Life With SLOODLE to Create a Virtual Learning Environment

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Abstract

As universities continue to increase their online presence, they are challenged to re-evaluate their ways of teaching to best utilize the new opportunities that digital technologies offer. While these technologies present a variety of methods for online collaboration, virtual worlds offer the added ability to interact within a realistic graphical environment, situating learners together in the same space and time. These features give participants a highly social and immersive environment within which they can represent their role-play characters through avatars. Integrated as part of a university course, the inherent social characteristics of these spaces create opportunities for interactions that can increase students’ motivation to learn. Beginning with a discussion of the pedagogical foundations of virtual learning environments (VLE’s), this paper describes the instructional situations that these environments are best suited to teach. Focusing on four components found to be inherent in such spaces - enabling contexts, resources, tools and scaffolds (Hannafin, Hannafin, & Oliver, 1999; Jonassen, 1999) the paper then describes a VLE that integrates Moodle and Second Life with SLOODLE to create a rich social constructivist virtual learning environment for teaching Security Council role-plays within an International Studies university course.

Introduction

What is a Virtual Learning Environment (VLE)? The term can refer to any teaching and learning tool that is transmitted online, but to be valuable, the environment needs to include certain characteristics that are conducive to learning. Dillenbourg (2000) provides seven useful guidelines for thinking about VLEs during the design process:

- The information space has been designed.
- Educational interactions occur in the environment, turning spaces into places.
- The information/social space is explicitly represented. The representation can vary from text to 3D immersive worlds.
- Students are not only active, but also actors. They co-construct the virtual space.
- Virtual learning environments are not restricted to distance education. They can also enrich classroom activities.
- Virtual learning environments integrate heterogeneous technologies and multiple pedagogical approaches.
- Most virtual environments overlap with physical environments.

The 2D virtual environment is currently much more accessible and useful for learning than the 3D environment (Thorne, 2009). Learning management systems such as the open source system Moodle allow accessibility from anywhere in the world, the uploading and sharing of materials, online discussions and chats, the ability to give quizzes, tests, take surveys, record grades, and give and review assignments, and much more. However, literature suggests that 3D virtual worlds can be better suited for experiential learning environments (Jarmon, Traphagan, Mayrath, & Avani, 2008).

Three-dimensional (3D) virtual worlds such as Second Life, Croquet and OpenSim have been described as desktop interactive virtual reality within a chat environment that "offer the illusion of 3D space, avatars that serve as the visual representation of users, and an interactive chat environment for users to communicate with one another (Dickey, 2005)." They have been used for a number of educational purposes in various settings and within diverse disciplines of study (i.e. media arts, education, health and environment, commerce, language, computing and librarianship.) Hew & Cheung’s (2010) review of literature on 3-D virtual worlds in K-12 and higher education settings indicates that virtual worlds may be utilized to communicate information between people; to become immersed or embodied within a 3-D environment through an avatar; and to act on an object. There are several benefits of using this technology. Hew & Cheung’s (2010) analysis revealed students enjoyed moving around in the 3-D space, meeting new people, and having simulated experiences. However, students are averse to inaccessibility through older and public computers, issues and expectations of using the chat tool, and unfamiliarity with the virtual
world software. Pfeil, Ang, and Zaphiris (2009) studied the usage patterns of teachers and learners in the 3D virtual world, Second Life, and identified the following list of challenges that they faced:

- Signing up students into Second Life (SL): Getting students signed up requires preparation and is time-consuming.
- Orientation and navigation in SL: Navigation and orientation in SL is very challenging for first-time users.
- Issues of identity: For groups that have already met face-to-face, group dynamics and familiarity have to be re-established in SL. Additionally, it is difficult for tutors to identify students in SL, track their progress and assess their learning performance.
- Communication patterns in SL: Switching between different communication channels is problematic, as it increases the cognitive load and requires students and tutor to re-adjust.
- Teamwork: More time without the tutor allows for more socialization, but often, tutors are keen on “being here” and observe the student’s learning process.
- Assessment: Learning in SL often takes place by playing and exploring, but how can playing and exploring be assessed?
- Accessibility: At the moment, SL is totally inaccessible for students with visual impairments. Additionally, not only mechanical access, but also the social construction of disability in SL impact on the power-distribution within SL.

**Pedagogical Foundations**

Much of the literature on educational uses of VLEs centers on the constructivist paradigm (Dickey, 2005), and frequently cites the instructional design theories of learning environments (e.g., Hannafin, Hannafin, & Oliver, 1999; Jonassen, 1999). These theories tend to focus on problem solving in ill-defined domains or situations that value multiple perspectives over one “correct” solution. The Open Learning Environment (Hannafin, et al.) is based on values such as personal inquiry, self-directed learning, and hands-on experiences involving realistic problems that have relevance to the student. Similarly, Jonassen’s Constructivist Learning Environment values learning that is based on experiences that are authentic and facilitate conceptual knowledge-making. There is some convergence between the methods that these types of theories offer, and they seem to share at least these four components:

**Enabling contexts**

Hannafin, et al. (1999) describe these as externally induced, including methods such as case studies, projects, or questions (Jonassen); externally imposed, such as role-plays; or individually generated by students who choose relevant questions on their own. Enabling contexts can help activate prior knowledge relevant to the topic at hand, help learners choose strategies that they have found useful in the past, or provide background information for specific roles that the students are given to play.

**Resources**

Successful learning environments provide a variety of resources that learners can use – websites, videos, books, articles, and subject matter experts are a few examples. They can be static (e.g., print resources) or dynamic (e.g., interactive charts and diagrams). Learners may have these resources provided to them or may need to research and locate their own.

**Tools**

These include information processing tools (seeking, collecting, organizing, integrating, or generating tools), manipulation tools, and communication tools (synchronous and/or asynchronous). Information processing tools promote many types of behaviors. These include seeking (e.g., researching, using maps and diagrams); collecting (e.g., cutting and pasting found information, recording speeches); organizing (e.g., creating outlines); integrating (reflecting); and generating (e.g., creating reports or briefs)

**Scaffolds** (domain-specific, conceptual, metacognitive, procedural, strategic)
Scaffolds may be provided in different ways: by tools, teachers, subject matter experts, or peers. There are also different types of scaffolds, including procedural scaffolds that provide direction, conceptual scaffolds that prompt students as they learn content matter, and metacognitive scaffolds.

Potential outcomes include motivation from learning topics that have real-world implications, deep rather than surface learning, and increased critical thinking skills.

The VLE described in this paper consists of the integration between an LMS (learning management system) and a virtual world, each providing some level of support within these four components. The Virtual Model UN (VMUN) Learning Environment in particular is built using the open source LMS Moodle and the virtual world Second Life. These two programs are integrated using an open source application called SLOODLE (Simulation Linked Object Oriented Dynamic Learning Environment), which provides various tools that connect features such as course registration, chat, IM, blogging, and assessment between the two environments.

**Role-Play**

Role-plays are effective ways to teach and assess learning (e.g., McCarthy & Anderson, 2000; Ip & Linser, 2001), with the goal of helping students consider alternative viewpoints, explore opportunities and barriers, and develop their critical thinking skills (Belloni, 2008). Therefore, they are well-suited as teaching strategies within the framework of social constructivism for virtual learning environments.

Although the use of role-plays and simulations in the classroom is rising, very little attention has yet been paid to the practical application and integration of role-plays into coursework, especially at the university level (Asal, 2005). Furthermore, most educational political science role-play simulations are still performed face-to-face in the classroom. However, a small number of educators have begun using online discussion forums (either separate from or within their organization’s learning management system) or dedicated web applications (e.g., ICONS Project, USIP OSP (United States Institute of Peace Open Simulation Platform)) to supplement the more traditional approaches. This paper argues that these online role-plays can be further enhanced within the framework of an entirely online class through the use of three-dimensional virtual worlds. They offer some important benefits over discussion forums, such as ‘presence’ (Bronack, Sanders, Cheney, Riedl, Tashner, & Matzen, 2008) and the ability to communicate in real-time chat, IM and voice. According to a recent study involving enactive role-play in Second Life, students “valued the embodied experience afforded by the immersive virtual environment (Jamaludin, A., Chee, Y. & Ho, C., 2009).” During a recent enactment of a Security Council meeting involving the University of Central Florida’s Model UN student organization (Figure 1), one participant noted that she was less nervous during the virtual as compared to face-to-face role-plays. This may be a promising area for future research – for example, role-playing in a virtual environment such as Second Life may allow more introverted students to communicate more and have higher performance outcomes (Gao, Noh, & Koehler, 2008).
The Virtual Model UN (VMUN) Learning Environment

Model UN can trace its roots back to the Model League of Nations. It is a simulation of the UN General Assembly as well as other UN bodies. Students play the roles of ambassadors of member UN states to debate topics that are on the UN’s agenda. During the role-play exercise, students learn by researching their roles, making speeches, participating in debates, reflecting, and debriefing. These activities require a combination of pedagogical components that can include traditional (e.g., lecture, tutorial) and alternative (e.g., discussion, chat) methods of instruction.

VMUN gives learners a realistic environment closely aligned with the United Nations Security council building. The learning environment provides enabling contexts, resources, tools and scaffolding to meet the learning objectives of the International Organizations course.
Two-Dimensional Environment (Moodle)

Moodle is an open source learning management system (LMS) that is also referred to as a VLE. It is highly scalable, making it deployable from small to very large organizations. It includes many features common to LMS’s, including activity modules (e.g., forums, chats, wikis, blogs, and databases) to create social constructivist environments or modules for more traditional elements such as instructional content and assessments (e.g., choice, quizzes, assignments). It has an extensive community of users and developers, extensive documentation, and a wide variety of plugins to enhance and add features to the default installation.

It provides several of the components necessary for an open learning environment. Within the context of role-play, it houses descriptions of the scenario, information about the roles to be played, and links to resources within and external to Moodle to help the players succeed in their learning objectives. It offers communication tools that offer students the ability to collaborate, create alliances, hold secret negotiations, or contact the instructor. One of these communication tools is linked to the web intercom Sloodle tool, allowing students within Moodle to communicate with others in Second Life.

VLE Integration (SLOODLE)

SLOODLE is also an open source project and offers integrative support for both teachers and learners as they navigate the digital environment. VLE tools such as identity management to keep track of registered students and their avatars, WebIntercom, for real-time, two-way communication between users in Moodle and Second Life, and chat logs to archive and retrieve chat in both environments (Kemp, Livinstone, & Bloomfield, 2009) alleviate several issues cited in the Pfeil, Ang, and Zaphiris study (2009).

The first step of the integration procedure is installing the software into Moodle. This currently requires back-end access to the Moodle installation to transfer the necessary files to the correct folders and then create the database tables by pointing to the Moodle administration page. The exact instructions (which can be found at SLOODLE’s Wiki) are beyond the scope of this paper.
After it is installed successfully in Moodle, the SLOODLE Set can be obtained from SLOODLE Island in Second Life. Again, the exact procedure for integrating the set with Moodle can be found on the Wiki. It involves rezzing (bringing the object out of your inventory to the ground at your VLE) and then clicking the box and following the directions. Figure 3 above shows the box successfully integrated with the Moodle course site. The text above the box shows the Moodle website’s address, http://slmodelun.org/moodle, and the name of the course, International Organizations. The text “Connect Moodle” and the little button on the top of the Sloodle Set box will turn green.

Once the two environments are communicating with each other, it is possible to click the Sloodle Set box and draw out the tools that are included. The VMUN environment uses two of these tools: the Registration tool, and the WebIntercom.

The registration tool (Figure 4) helps instructors identify their students in Second Life by linking their real life names to their avatars. This feature allows instructors to keep track of their students within both the Moodle and Second Life environments – as noted earlier, one of the frequently cited disadvantages of teaching in Second Life is the difficulty of tracking students within the Second Life environment to align them with their assessments and other content in the 2D environment. Furthermore, assessments given within Second Life using SLOODLE tools such as the quiz chair or Choice are automatically assigned to the correct students in Moodle.

Figure 3 The Sloodle Set
Three-Dimensional Environment (Second Life)

Virtual worlds, Second Life among them, are drawing scores of educators looking for opportunities to experiment with experiential and constructivist learning spaces. Further, Dede’s (1995) research implies that 3D virtual spaces provide a safe environment in which to learn by doing. However, there are some important considerations for design in a three-dimensional space. A recent review of literature on the use of Second Life in K-12 and higher education shows that researchers found role-playing to be a worthwhile activity as well as a convergence of four recommendations among them (Inman, Wright & Hartman, 2010):

- Establish a clear connection between the course objectives and activities in Second Life.
- Incorporate technical training and support into any planned Second Life activity.
- Create scaffolded learning activities for students so they can practice inside Second Life and acclimate to the virtual environment.
- Design and construct different spaces to encourage different types of student interaction.

The primary tools and scaffolding required for role-play are related to communication and social connections between the learners and instructors. Moodle provides multiple communication tools: chat, email, discussion forums, wikis and blogs among them. Depending on the learning objectives and the preferences of the instructor, each of the tools can provide an important function of a role-play simulation. The main role-play area of the VMUN environment is the Security Council Room. In Figure 5, the Security Council Room is shown with a WebIntercom (turned on and off by a click of the mouse) set up to record all chats during the meetings. Separate chat sessions can also be set up within Second Life to provide space for private meetings between groups. This is designed by creating chat spaces that are beyond the parameters of each other (to ensure that other groups cannot listen in) and WebIntercom boxes can then be set to record only for the group.
Figure 5: Web Intercom logs chat and connects with chat module in Moodle

Manipulation tools are also important during role-play. For example, Security Council members require some method of calling attention to themselves so that they may get the floor and speak. Tools such as buzzers that can be clicked or banners that can be raised can be used for this purpose.

These are some of the many tools and scaffolds that are available for the design of a virtual learning environment.

Conclusion

VMUN Learning Environment is a work in progress. It is based on a social constructivist pedagogical foundation and designed to include four components that are commonly found in virtual learning environments (Hannafin, et al., 1999). During the VMUN environment’s design process, role-play simulations will be run for international studies and political science courses. It is the intent of the authors to begin the next step of the project – evaluation – in the Spring semester, with a planned role-play simulation for an American University Human Rights course. To ensure that the VMUN’s design is correctly aligned to its learning objectives, the evaluation process will be based on Hannafin, Hannafin, & Land’s (1997) conception of grounded design, with concerted effort put into complying with its four conditions:

- The design must be based in a defensible theoretical framework: the social constructivist framework is a proven and defensible framework.
- Methods must be consistent with the outcomes of research conducted to test, validate, or extend the theories upon which they are based.
- Generalizable – although the Virtual Model UN environment is a specific real-life environment, the methods themselves are generalizable to other teaching strategies within the social constructivist framework, using the components inherent in these environments.
The design must be validated iteratively through successive implementation – this is the next step in the VMUN project. Each implementation of the environment will provide opportunities to “continuously inform test, validate, or contradict the theoretical framework and assumptions upon which” the environment is based (Hannafin, Hannafin, & Land, 1997, p. 103).

Aligning design to these concepts does not guarantee success. The concepts themselves may be found to need refinement as VMUN is iteratively validated. As Hannafin, Hannafin, Land suggest, it is important to practice the social constructivist ethic within the design process itself by avoiding restricted or rigid perspectives about the methods employed and evince a willingness to adapt and evolve every part of the development cycle.

References


