Building virtual learning communities


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Chapter XV
Building Virtual Learning Communities

Naomi Augar
Deakin University, Australia

Ruth Raitman
Deakin University, Australia

Elicia Lanham
Deakin University, Australia

Wanlei Zhou
Deakin University, Australia

ABSTRACT
This chapter introduces the concept of virtual learning communities and discusses and further enhances the theory and definitions presented in related literature. A model comprising four criteria essential to virtual learning communities is presented and discussed in detail. Theory and case studies relating to the impact of virtual learning communities on distance education and students from diverse cultural groups are also examined. In addition, this chapter investigates the enabling technologies and facilitation that is required to build virtual learning communities. Other case studies are used to illustrate the process of building virtual learning communities. Emerging technologies such as wikis and video lectures are also analysed to determine the effects they have on building and sustaining effective virtual learning communities.
INTRODUCTION

Virtual communities are created when people form groups online to share a common interest and create a social bond that is nourished with continued interaction over time (Powazek, 2002). Social virtual communities, also known as discourse communities, have existed on the Internet for many years. Communities supported by Internet discussion boards and the like are dedicated to interests as diverse as pop stars and football. All involve the sharing of knowledge, support, and common interests through ongoing social interaction online (Jonassen, Howland, Moore, & Marra, 2003; Rheingold, 1994; Wood & Smith, 2001).

Computer-supported collaborative work has been the subject of research since the 1970s when communications technology evolved to support virtual communities in the workplace (Lewis, 2002). Work-related virtual communities are also known as communities of practice (Wenger, 1998). These communities allowed their workers to share business knowledge and learn from and support one another (Jonassen et al., 2003). Employees at different offices and those working from home can also share a mutual sense of presence provided by such communities (Dourish & Bly, 1992; Schraefel, Ho, Chignell, & Milton, 2000).

The advent of the Internet has had a huge impact on teaching and learning around the world. The Internet and its associated communication media have the potential to revolutionise learning (Lewis, 2002). It is not only a powerful tool for content provision, but it also lends itself to the creation of groups of learners who can support each other in the learning process (Bruckman, 2002).

Traditionally, universities have used classroom-situated tutorials as a means of facilitating discourse among learners so they can construct a solid understanding of course materials through social interaction with their peers and instructors. Virtual learning communities can now provide a classroom online, in which students may interact with each other and their instructors. The virtual nature of the classroom means that students can join in regardless of their location. Consequently, participation in a learning community can be particularly beneficial to those who study entirely online, such as distance learners. It can help learners to overcome their feelings of isolation and enhance their learning experience through interaction with their peers (Blunt, 2001; Haythornthwaite, Kazmer, Robins, & Shoemaker, 2000; Lanham & Zhou, 2002).

The work of Haythornthwaite et al. (2000) describes a virtual learning community that used multiple technologies to connect distance learners. The distance program included some classroom-situated seminars. However, the bulk of the learning experience was conducted online. E-mail and Internet discussion boards were the prime means for communication among students and staff. Internet Relay Chat (IRC), a text-based synchronous discussion program, allowed students to partake in informal social communication known as “whispering” during real-time virtual lectures. IRC was also used by students to ask the instructor questions during the live lectures. The lectures were delivered online using PowerPoint slides accompanied by narration. Interviews conducted throughout the duration of the course showed that students who communicated actively identified themselves as members of a learning community and felt less isolated and less stressed than those who did not participate.

Palaver Tree Online is a virtual learning community that connects students with mentors who help the students build a database of oral history. Students interview elders online using specially developed discussion software that integrates individual profiles of the elders. Students can also create stories that summarise what they have learned in their interviews and publish them within the integrated online environment (Ellis & Bruckman, 2001).
Jonassen et al. (2003) describe several virtual learning community projects such as Knowledge Forum, CaMILE, SWiki, and Shadow netWork-space. All share discourse as the common method for building communities of learners. The projects use various tailor-made software solutions to create flexible discussion forums and platforms for collaboration on documents and the construction of knowledge by students. Some of these communities also involve mentors interacting with students to share knowledge and achieve learning goals in a manner similar to the Palaver Tree Online project.

These examples illustrate some of the possibilities of virtual learning communities. Subsequently, this chapter defines virtual learning communities and discusses the technologies and facilitation required to build them. It explores the pedagogy of virtual learning communities and presents case studies to illustrate the community building process.

VIRTUAL LEARNING COMMUNITIES

The evolution of modern day virtual learning communities can be traced back to the industrial revolution and beyond. People have formed learning communities to share knowledge throughout history. Virtual learning communities facilitated by the Internet are an extension of this trend (Lewis, 2002).

There are varied notions of what constitutes a virtual community (Daniel, McCalla, & Schwier, 2002; Jones, 1997). A learning community is made up of individuals who work together in a shared space to increase their knowledge and understanding of a subject through study and experience (Saragina, 1999). In a virtual learning community, the shared space that the community inhabits is the Internet.

A virtual learning environment is created on the Internet using study materials, discussion boards, and instructors (Augar, Raitman, & Zhou, 2004a; Augar, Raitman, & Zhou, 2005; Oren, Nachmias, Mioduser, & Lahav, 1998). However, the provision of content in a virtual environment accompanied by a discussion board is not sufficient in and of itself. For virtual communities to exist, they must have a minimum level of interactivity among a variety of communicators in a common public space, with a minimum level of membership sustained over time (Augar et al., 2004a; Jones, 1997; Wood & Smith, 2001).

A virtual learning community is a group of learners that interact in a common online environment to gain understanding of subject matter. Learners build on their knowledge by interacting with each other, their instructors, and learning materials. By sharing a common learning goal and interacting socially over a period of time, learners develop and share a sense of belonging and shared purpose (Augar et al., 2004a; Augar et al., 2005).

E-Learning Environment or Virtual Learning Community?

“Community” is a common word in current e-learning literature. This section compares and contrasts e-learning environments and virtual learning communities to clarify their similarities and differences.

An e-learning environment comprises the tools and content required to facilitate an online learning experience for students. It may comprise threaded discussions, synchronous chat, whiteboard tools, and content such as HTML, PDF files, or even multimedia presentations. Note that this definition implies that providing learning tools and content to students online does not automatically result in the creation of a virtual learning community. Such a view is technologically deterministic (Augar & Zhou, 2003; Jones, 1997). Rather, the provision of learning tools and content online creates an e-learning environment.

In most cases, e-learning environments require facilitation from teaching staff, as is the case
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for virtual learning communities. Facilitation may take the form of tutors moderating online discussion forums for students. E-learning environments and virtual learning communities are similar because students have a shared learning goal in both settings. However, the outcome of the shared learning goal in an e-learning environment is the successful completion of the subject. As later sections will discuss, virtual learning communities can encourage students to become more active in defining their shared learning goal. Moreover, virtual learning communities allow students to work together as a group to achieve shared learning goals.

Similarities aside, the key point that differentiates a virtual learning community from an e-learning environment is social context. Students develop social presence as a sense of community emerges in an e-learning environment. In developing social context, students feel a shared sense of community with their fellow learners and they identify with the community as a whole.

E-learning environments and virtual learning communities share the following common aspects: tools, content, facilitation, and shared learning goal. However, it is the development of social context among learners that turns an e-learning environment into a virtual learning community. Hence, careful consideration should be given to labelling an e-learning environment a “community.” A host can provide the tools and facilitation that lay the foundations, but a community will only emerge if and when the participants choose to identify themselves as members of a community (Haythornthwaite et al., 2000; Powazek, 2002).

While this chapter will outline what the developer can do to increase the chances of building a virtual learning community, it is the users who will determine whether the developer’s efforts are a success. As Jonassen et al. (2003) point out, virtual learning communities are an ideal that may not ever be completely attainable. Therefore, the important aspect to note is whether the learning group is moving towards or away from the ideal of a community.

**ESSENTIAL CRITERIA FOR VIRTUAL LEARNING COMMUNITIES**

To further refine the discussion presented in the previous sections, four interrelated criteria are presented that are building blocks for the development of a virtual learning community. These criteria are: social context, facilitation, technology, and a shared learning goal. They are presented in the model depicted in Figure 1 (Augar et al., 2004a).

These four interrelated essential criteria are critical to the process of fostering a sense of community amongst learners. They are themes that will be reiterated throughout this chapter, as they are central to the process of building effective virtual learning communities. The following sections explore these criteria in greater depth.

**Technology**

For a sense of community to emerge in a virtual setting where people interact with one another in an online environment, there must be a shared space where communication can occur (Augar & Zhou, 2003; Blunt, 2001; Jones, 1997; Wood

![Figure 1. Critical building blocks for a virtual learning community](image-url)
Building Virtual Learning Communities

& Smith, 2001). Technology allows learners to transmit, save, organise and extend the knowledge shared by the community members (Jonassen et al., 2003).

Consequently, technology is fundamental to the development of any virtual learning community. Reliability and ease of use are fundamental requirements for technology that supports e-learning. Students learning online can become alienated when they experience technical difficulties, which can diminish their motivation to participate (Augar et al., 2004a; Hara & Kling, 1999).

One of the most widely used technologies for enabling virtual learning communities is the asynchronous discussion forum. Asynchronous discussion tools and e-mail are used to create lively discourse relating to learning materials. Real-time collaboration tools may also be used, but they may disadvantage distance learners where time differences are a factor. Learning materials are provided as supplements to the interactive tools that facilitate the virtual learning community. Text-based and multimedia reference materials containing course content such as lecture notes, video lectures, or weekly readings provide resources to support the discourse that is the foundation of the community.

Most virtual learning communities are text-based. Access to these learning communities is gained via a software interface, which runs over the Internet. Students can use their personal computer to type messages and contribute or “post” them to ongoing asynchronous discussions that are maintained on a host server (Augar & Zhou, 2003).

Deakin University runs an e-learning environment called Deakin Studies Online (DSO). DSO uses WebCT Vista software, which has been customized especially for Deakin University. Figure 2 shows a screen shot of the DSO asynchronous discussion tool. This tool is used regularly by students, both to communicate with their peers informally and to participate in structured learning activities, such as online tutorials.

Synchronous text-based chat systems can also facilitate virtual learning communities.

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**Figure 2. DSO’s discussion tool**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Messages</th>
<th>Author</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Let us what you think about the Wiki</td>
<td>50</td>
<td>Augar, Naomi</td>
<td>22 July 2004 4:00 PM</td>
</tr>
<tr>
<td>Close this window</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topic: Wiki Use Feedback</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject: Tell us what you think about the Wiki</td>
<td>Date: 22 July 2004 4:00 PM</td>
<td>Author: Augar, Naomi</td>
<td></td>
</tr>
<tr>
<td>Hi Everyone,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am Naomi, an online tutor for SCC306 and the SITWiki Administrator. This is the first time we have</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make as image, think as online</td>
<td>Create print view</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Messenger, and ICQ provide simple examples of software interfaces that allow learners from around the world to participate in real-time discussions. Each user can compose messages, which can be immediately viewed by other participants who in turn have the opportunity to respond. MSN Messenger and ICQ differ from asynchronous technologies in that each “chat” session is initiated by individual users and is not hosted on a designated central server. Unless a participant chooses to “log” a chat session (keep a transcript), there is no ongoing record of discourse between users (Augar & Zhou, 2003).

Deakin University’s DSO system has an integrated chat facility for learners. Instructors may add this facility to their subject’s learning area for students to access as part of learning activities. The interface of the DSO chat facility is depicted in Figure 3.

The advent of cheap, accessible multimedia technology has allowed virtual learning communities to evolve and thus include video and audio content. Previously, video conferencing and streamed video placed a huge load on telecommunication networks. Consequently, video was an expensive and cumbersome medium for use in virtual learning communities. However, as the telecommunications network bandwidth has increased and the price of services such as broadband Internet has decreased, video has been adopted by some community builders. This trend has been encouraged further by the reduced cost of audio and video capture devices, and the increased speed and memory of personal computers (Augar & Zhou, 2003).

Computer-mounted video cameras (Web cams) can be used in conjunction with programs that support video such as MSN Messenger or Microsoft NetMeeting to establish video conferences with groups. Shareware such as CU-SeeMe allows larger groups of people to conduct video conferences in video chat rooms that can be supported with text-based chat facilities (Jonassen et al., 2003).

Facilitation

Facilitation plays a key role in the successful development of a virtual learning community (Augar et al., 2004a; Carlsen, 2003; Stacey, 2001). The

Figure 3. DSO’s chat integrated facility
facilitation of virtual learning communities occurs when instructors begin interacting with learners in the e-learning environment. The process of guiding the learners in their development of social context and shared learning goals is critical to building the virtual learning community.

Salmon (2003) proposes a five-stage model of teaching and learning online that was developed as a result of action research undertaken at Open University in the United Kingdom. The model charts the changing needs of students and the role of the facilitator throughout the online learning process:

1. **Access and motivation**: Students focus on gaining access to and becoming familiar with the system. Facilitation at this stage is based on welcoming students, solving access issues, and encouraging participation.

2. **Online socialisation**: Students develop their online identity and begin to interact with the group. Facilitation focuses on helping individuals create their own social presence and encouraging social interaction amongst the group.

3. **Information exchange**: Participants exchange course-related information. Facilitation at this stage focuses on guiding students through the learning task, helping them to access appropriate learning materials, and guiding them in the process of information exchange. Up to and including this stage, the interaction is cooperative and supports the goals of the individual. At Stage 4, the interaction becomes collaborative.

4. **Knowledge construction**: At this stage, interaction becomes collaborative and communication is based on the common culture of the group. The facilitator adopts a more passive approach to moderation, allowing the students to engage in active discourse and broaden and develop their knowledge. The facilitator may guide the discussion by providing summaries of the group’s ideas and relating them back to the central learning goals of the course.

5. **Development**: Individuals look for ways to benefit from the system and achieve their learning goals. The facilitator takes on a supportive role at this stage and responds to queries posed by the group. The learners are active and confident in learning through discourse in the online environment.

This model documents the critical and changing role the facilitator plays in the community-building process. They must teach the students how to interact and learn online, facilitate appropriate social interaction, guide their learning, and be responsive to and supportive of the needs of the learning group.

Participation in a virtual learning community requires students to review and understand the input of others, and formulate and contribute appropriate responses so they can have meaningful participation in online discourse. However, students may be more familiar with memorizing course content than they are with evaluating information and forming their own opinions about it. Consequently, the instructor may need to teach students how to communicate online, and provide ongoing monitoring to support active discourse (Jonassen et al., 2003).

The facilitator plays a critical role in modeling social presence and identity for students. The facilitator can set the tone for the community, and aid the development of trust and social bonds among learners. Building trust among learners is critical. Students can create a shared history and develop a sense of trust by sharing their experiences and knowledge within the virtual environment (Augar et al., 2004a; Daniel et al., 2002; Rovai, 2002).

The instructor needs to encourage the emerging sense of community among students while ensuring that the learning task is being completed (Lewis, 2002; Rovai, 2002). Students can become frustrated when they do not receive timely and
clear advice in an online environment. By identifying and being responsive to student needs, facilitators can provide added motivation for students to participate (Augar et al., 2004a; Blunt, 2001; Hara & Kling, 1999). Another important aspect of establishing and facilitating appropriate social interaction in a virtual learning community is the implementation of a set of usage policies that are clearly and simply communicated in the e-learning environment, and enforced when necessary (Augar, Raitman, & Zhou, 2004b; Augar et al., 2005; Powazek, 2002).

Social Context

Social context defines the way social interactions are carried out within a virtual learning community. It is the sum of the identity and behaviour of individual participants and helps to define the communities’ social identity (Jonassen et al., 2003). Over time, virtual communities develop unwritten rules on how to behave in the online environment. These rules allow participants to expect a certain standard of behaviour and help to develop a level of trust between community members (Haythornthwaite et al., 2000).

Virtual learning communities require students to develop social bonds in a short period of time so they can interact freely and focus on the course content. The process of developing and sustaining social context depends on the ability of learners to interact socially for enough time to develop a level of trust among the group (Augar et al., 2004a; Daniel et al., 2002).

In virtual learning communities, students are largely restricted to text-based communication, which has inherent limitations. Face-to-face communication is regulated by visual and audible cues that indicate someone has finished speaking and another person may start to talk. These cues include for example, finishing a sentence, body language, and vocalizations. Students new to learning in a virtual environment can be frustrated by their inability to detect these cues (Augar & Zhou, 2003; Hiltz & Turoff, 1993).

The absence of audible and visual cues may result in people being ruder than normal because they cannot see the recipients’ reaction or gauge non-verbal cues (Baym, 1995). However, the absence of contextual cues can also be helpful as authors must take more care to ensure they communicate clearly (Jonassen et al., 2003). Consequently, the facilitator’s role in modelling appropriate social interactions during the founding stages of a virtual learning community is critical to its ongoing success (Augar & Zhou, 2003; Stacey, 2001).

In a virtual learning community, each student’s online identity is based on what he or she tells other community members about him or herself. Tools such as profiles (text-based biographies with an optional photograph posted within the e-learning environment) can help new students introduce themselves to the learning group in a non-threatening way (Augar & Zhou, 2003; Blunt, 2001). An interactive extension of this idea is an icebreaker exercise where groups of learners answer sets of socially oriented questions as a group in a discussion forum, introducing themselves to the other group members in the process. The facilitator can model appropriate social presence by taking part in the icebreaker exercise and constructing a profile of his or her own for the students to mimic (Augar et al., 2004b, 2005).

Shared Learning Goal

Virtual learning communities develop when participants can share knowledge about common interests and work to achieve shared learning goals (Daniel et al., 2002; Jonassen et al., 2003). Students may have their own learning goals, including attaining a degree or passing a subject. However, they may not consider participation in a discussion group or a virtual learning community to be a part of achieving those goals. Consequently, the development of a shared learning goal in a group of online learners can be very difficult to achieve (Augar et al., 2004a; Lewis, 2002).
Students can be motivated to participate through assessment that evaluates whether their contributions to group discussions were on time, relevant, and of a high quality (Rovai, 2002). However, Carlsen (2003) feels that for community to emerge, participation should be at least partially voluntary. A student’s motivation for participation plays a critical role in the development of a shared learning goal. If students cannot see the benefits of participating in terms of their own goals, they may have a negative perception of the experience. Encouraging participation through assessment may be effective, but it may not result in an authentic virtual learning community.

Certain student groups may be more predisposed to participating in virtual learning communities. The work of Haythornthwaite et al. (2000) demonstrates the benefits virtual learning communities have for distance learners who experienced a reduced sense of isolation by belonging to the learning community. Reduced isolation and the support offered by the community influence a student’s motivation to interact socially with other students, who would otherwise be strangers online.

Finally, the goal of any virtual learning community should always be communicated clearly to students (Blunt, 2001). Simple, unambiguous explanations about the aim of the exercise or discourse can reduce student frustration and help them focus on the learning task, rather than questioning why they have to participate. Continued prompt feedback and guidance from facilitators throughout the learning process can help students move toward the development of a shared learning goal.

The interrelated nature of the four criteria outlined here—technology, facilitation, social context, and shared learning goal—means that while all must be present, aspects of the criteria overlap. For example, by guiding the students in the completion of tasks, the facilitator aids in the process of developing the students’ shared learning goal. This process highlights the relationship between effective facilitation and the development of a shared learning goal in the community. Likewise, facilitation is critical in the process of building social context. By modelling appropriate online behaviour, the facilitator helps the student establish an online identity and develop social bonds with other members of the learning group. Finally, effective facilitation can only occur if the enabling technology is usable by both the teacher and the students alike.

**THE PEDAGOGY OF VIRTUAL LEARNING COMMUNITIES**

This section looks at the theory of teaching and learning that provides the basis for using virtual learning communities as a teaching tool. Specifically, the areas of computer-supported collaborative learning (CSCL), constructivism, and constructionism are discussed. These areas lay the foundation for the central theme of learning communities: students working together and supporting one another in building knowledge that meets the learning objectives of the group (Jonassen et al., 2003).

**Computer-Supported Collaborative Learning**

The study of virtual learning communities encompasses the research areas of collaborative learning and CSCL. Collaborative learning can be achieved when students work together and share the responsibility for building on their existing knowledge (Myers, 1991). CSCL is a process where students work together on learning tasks using technology to facilitate their collaboration. CSCL can support and enhance peer interaction while enabling the sharing and distribution of knowledge and expertise among community members (Augar et al., 2004b; Lipponen, 2002; Raitman, Augar, & Zhou, 2004).
Constructivism and Constructionism

Constructivism is a process whereby the learner plays an active role in the learning process. The learner constructs new knowledge by building on his or her past and current experience (Brook & Oliver, 2003). Phillips (2000) identifies two different perceptions of constructivism. The first idea promotes constructivism as the shared body of knowledge built up through history. The second promotes the idea that knowledge is made as a result of learners constructing their own internal meaning and understanding of information (Duffy & Jonassen, 1992; Phillips, 2000).

Social interaction among learners plays a key role in the construction of knowledge. It provides students with a means to explore knowledge and achieve understanding of theory and concepts transmitted in the learning environment (Vygotsky, 1978, as cited by Stacey, 1999, 2001). In virtual learning communities, students can use discussion boards to discuss course content, question each other about subject matter, and through this process enhance their understanding of the material (Augar & Zhou, 2003).

Constructionism is similar to constructivism in that individuals create artefacts and in the process of doing so construct a greater understanding of subject matter (Dougimas & Taylor, 2002; Papert & Harel, 1991). Papert and Harel (1991) differentiate constructionism from constructivism by pointing out that constructionism occurs when learners construct real-world objects and enhance their knowledge in the process.

Bruckman (2002) contends that the true power of learning using the Internet lies not in the delivery of content to students who receive it passively. Rather, students should be active learners, gathering information resources and sharing them with their peers in an online environment supported by innovative collaborative tools. CSCL, constructivism, and constructionism all highlight the importance of learners interacting and collaborating to construct knowledge and artefacts that reflect their understanding of course materials. Research in these areas provides strong support and motivation for building virtual learning communities.

BUILDING CULTURALLY INCLUSIVE VIRTUAL LEARNING COMMUNITIES

Over the past five years, the number of international students studying at Deakin University has increased. This trend is predicted to continue over the next five years. These international students are from different cultural backgrounds and therefore have different approaches to learning. This increase is not limited to Deakin University. International student enrolments have also been on the increase over recent years at other Australian tertiary institutions, and this trend is expected to continue.

Dr. Brendan Nelson (2004) stated in a media release that Australia's international student enrolments reached an estimated 303,324 in 2003. This translated to a 17% growth in the higher education sector. The media release also indicated that Asia continues to remain the major source of international students, representing more than three-quarters of Australia's overseas students market (Lanham & Zhou, 2004a, 2004b).

An Australian Trade Commission report (2004) stated that in the year 2000, there were 182,000 international students studying at Australian institutions (150,000 onshore and 32,000 offshore). Fifty-six percent of these figures specifically related to University enrolments. The Australia-wide figures correlate with those collected by Deakin University.

During the period 2000 to 2002, there was an increase in the number of international students from Asian countries enrolling for study at Deakin. A significant increase in the number of students from China and Hong Kong was noted, showing an increase from 154 and 325 respectively in 2001, to 276 and 427 respectively in 2002 (Deakin University, 2003).
It has been indicated in several publications (Chin, Chang, & Bauer, 2000; Conlan, 1996; Lanham & Zhou, 2003a; Munro-Smith, 2002) that students with different cultural background have different learning styles. The figures above represent a diverse student body, with a majority of those international students from the Asian culture. Therefore, issues relating to virtual learning environment design for international audiences need to be addressed. Before a virtual learning community is created, an environment where this diverse student body can feel comfortable must be developed. In order to establish such an environment, the developers must focus on the issues relating to the design of virtual environments for international use.

When dealing with international or culturally diverse audiences, it is important to consider the design and layout of the interface. Nielsen (1996) suggests that the developer should ensure that the interface contains culturally neutral icons that will not cause offence to a culturally diverse audience. Metaphors and visual puns are not universally understood. For example, using a coffee cup as a visual icon representing a cyber café may provide a useful visual cue to some Western computer users. However, the developer should not assume that such an icon will be universally understood by a culturally diverse audience. Finally, where content is translated into multiple languages, developers should ensure that content is translated in its entirety so that all students have access to the same materials (Lanham & Zhou, 2003a, 2003b). Following these guidelines can aid in the construction of a culturally unbiased virtual learning environment.

Developers should also consider the design of learning materials when creating a culturally inclusive virtual learning environment. The following guidelines can aid this process:

- Review all content and language to ensure it is not offensive to other cultures.
- Identify how different cultures approach learning, and factor this into the learning outcomes of the subject.
- Try to tailor the learning environment so that all students can understand the content provided (Lanham & Zhou, 2003a, 2003b).

These points are a sample of the techniques that can be employed in an attempt to reduce the barriers between cultures in an online learning environment. Providing a culturally inclusive environment can allow students from diverse backgrounds to feel as though they are valued participants within a virtual learning community.

Using Wikis to Build Virtual Learning Communities

“Wiki” is a Hawaiian word meaning “quick” or “fast” in English. In 1994, Ward Cunningham used the word “wiki” as the name for a fully editable Web site that he invented (Leuf & Cunningham, 2001). In their book The Wiki Way, Leuf and Cunningham (2001) present wikis as an ideal technology for building virtual communities. Ongoing research at Deakin University is exploring this contention by attempting to use wikis to build virtual learning communities. This section introduces wikis, explains how they work, and describes a wiki pilot study undertaken at Deakin University.

Wikis

Wikis are Web sites that allow users to collaborate to create new documents (Web pages), edit the content of existing Web pages (text and pictures), or edit the structure of the whole site. All a user needs to edit, re-organize and read a wiki is a Web browser. Many wiki clones (versions of wiki scripts written in various programming languages) are available free of charge on the
Internet. Most wiki clones are relatively easy to install on a Web server for immediate use. Consequently, wikis have the potential to provide an efficient, flexible, user-friendly, and cost-effective interface for collaboration, knowledge creation and archiving, and student interaction (Augar et al., 2004b; Leuf & Cunningham, 2001).

Wikis can be used in **document mode** or **thread mode**. Wikis that are used in document mode act as knowledge repositories. Multiple users update the wiki content and over a period of time the wiki content grows to reflect the shared knowledge of the contributors, who remain anonymous. Wikis can also be used in thread mode to facilitate discussion amongst wiki users who each sign their posts (the content or message they added to the wiki) (Augar et al., 2004b, 2005; Leuf & Cunningham, 2001; Raitman et al., 2004).

To edit a wiki, users need to learn a set of basic mark-up rules, known as **wiki syntax**, that format wiki content in a manner similar to HTML. An example of using wiki syntax is enclosing a word in double apostrophes to make the word appear as bold text. However, many variations of wiki syntax exist. Some wikis provide an editing toolbar so the user can type in his or her content and format it by selecting the required text with a mouse and clicking on the appropriate formatting button in the toolbar. MediaWiki (http://wikipedia.sourceforge.net) has toolbar functionality, which is depicted in Figure 4 (MediaWiki, 2004). Examples of wiki syntax including square brackets and double apostrophes can also be seen in the text area shown in Figure 4 (Augar et al., 2004b, 2005; Leuf & Cunningham, 2001).

**Figure 4.** MediaWiki provides editing toolbar instead of using wiki syntax

### Background to the Wiki Pilot Study

Deakin University Australia offers a third-year computing subject “Computers, Society and Professional Ethics” that is taught entirely online. Students use DSO (introduced in the Technology section of this chapter) to participate in online discussion groups of ten students about subject matter over a 13-week semester. In addition to engaging in discourse, students produce collaborative documents that reflect their understanding of the subject matter as a result of their discussions (Augar et al., 2004a; 2004b; 2005). This mode of e-learning reflects the constructivist and constructionist approaches to learning outlined in the Pedagogy section of this chapter.

In the 2003 delivery of this subject, students were encouraged to develop a social presence in the first week of semester by publishing a single-page biography within their designated DSO discussion forum. It was envisaged that group members would read all of the biographies and use them as a means to get to know their fellow group members. However, very little social interaction occurred, and students did not engage in true discussion about the subject matter. Most students simply added their thoughts close to the deadline for contributions and did not comment about the contributions of others (Augar et al., 2004a; 2004b; 2005).

Survey research results indicated that students also experienced technology problems during the semester that impacted negatively upon their motivation to participate. Many students also felt that
facilitators did not provide feedback and guidance in a prompt and clear manner. Students expressed general dissatisfaction about participating in the online discussion forums at the end of the semester (Augar et al., 2004a; 2004b; 2005).

Subsequent research has focused on improving the collaborative aspects of the delivery technology by introducing wikis. An icebreaker exercise was developed for use on the wiki that aimed to help learners construct their online identity and enable each learning group to develop social context. Students were surveyed at the end of the 2004 semester to gauge their response to the wiki and the icebreaker exercise.

**Which Wiki?**

MediaWiki was selected for use in this study because of its toolbar, tracking, and authentication capability. The toolbar functionality was judged to be a critical feature as it meant students would not need to be familiar with wiki syntax to use the wiki. Tracking and authentication was required to enable marking of student contributions and to minimise the possibility of intentional misuse of the wiki. Authentication also allowed students to create personal profiles and sign their contributions, contributing to their development of social presence. Finally, MediaWiki is the wiki clone used to power a well-known online collaborative encyclopaedia, Wikipedia (http://en.wikipedia.org/wiki/Main_Page). Consequently, it was judged to be robust enough to support the 450 students who would use it as part of the study. The wiki was known as the Science and Information Technology wiki, SITWiki (Augar et al., 2004b; 2005).

**The Wiki Icebreaker Exercise**

Each discussion group (comprising 10 students) had its own icebreaker document on the wiki to complete as a group. Eighteen statements were included in the icebreaker exercise. Each statement prompted the students to add their name below the statement if it applied to them. Students could elaborate on the statement and in doing so tell the group a little about themselves. An example of a statement is “Members who have lived overseas.” This example prompted students who had lived outside of Australia to post a signed message underneath the statement that detailed the country where they had lived.

Each group had two weeks to update the icebreaker document so that every statement had at least one group member’s signed response underneath it. A partially completed example is shown in Figure 5.

Prior to commencing the exercise, instructors seeded icebreaker with information about themselves. They did this to introduce themselves to the group whilst modelling appropriate social presence and setting the tone for the exercise. Instructors signed their posts and in doing so created a hyperlink (as shown in Figure 5) to their wiki user page which contained a photo and a brief biography about themselves (Augar et al., 2004b, 2005).

**Results**

Prior to the icebreaker, many students had not used a wiki before. Some had not even heard of a wiki. The only training students received was in the form of e-mail-based technical support (to respond to specific queries) and an FAQ page provided on the wiki that contained simple instructions on how to edit and perform other required tasks. However, all students who used the wiki were able to satisfactorily complete the icebreaker exercise and introduce themselves to the other students in their discussion group (Augar et al., 2004b; 2005).

A usage policy was developed and displayed on every page of the wiki. The policy consisted of four guidelines that were written in a positive simple manner to encourage a wiki culture of cooperative, respectful usage. Across the 50 groups who used...
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the wiki, there were no incidences of intentional misuse or deletions of wiki content. Sixty-seven percent of students reported that they enjoyed participating in the wiki environment. These positive results were mirrored in the students’ overall rating of the wiki experience, as can be seen in Figure 6 (Augar et al., 2004b; 2005).

Technology

MediaWiki proved itself to be a reliable collaboration platform, supporting over 450 users with no system failures during the two-week icebreaker exercise. Students viewed the wiki between one-to two-thousand times per day and, on average, edited the wiki 150 times per day. When the SITWiki was installed and all the exercises and associated pages were uploaded, the wiki contained approximately 100 pages. Throughout the two-week duration of the exercise, the number of pages increased steadily each day to a final tally of over 1000 pages (Augar et al., 2004b).

Seventy-three percent of students surveyed found the wiki easy to use. Part of the survey asked students to identify what they felt were the positive characteristics of the wiki. Many students felt that the ability to interact with the wiki from anywhere at any time was a valuable feature. This response may be due to the fact that 31% of total enrolments for the subject comprised distance education students, for whom time differences and flexibility are key issues. This anywhere-anytime aspect of wiki functionality positions the wiki as an accessible and inclusive platform for building virtual learning communities (Augar et al., 2005).

Some students felt that the user interface lacked simplicity and could benefit from more colour and icons. They indicated that they would appreciate more control in the final presentation of their work via greater support for HTML formatting. However, they did appreciate the fast download speeds that resulted from the basic HTML format of page content (Augar et al., 2005).

Students also recommended a feature they felt would enhance the wiki—a tool that would highlight the modifications that were made since their last access. Some students found it difficult to keep track of what they had or had not read on the wiki due to the unstructured nature of the editing process. Such a feature may include e-mail alerts that may help inspire students to revisit the wiki in order to make further contributions or read and comment on the contributions of others.

The final technical feature that students disliked was the possibility that inconsistencies...
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could occur through simultaneous page editing. For example, if Student A started to edit at 2:00 p.m., Student B started at 2:01 p.m. and finished at 2:03 p.m., when Student A completed his or her editing at 2:06 p.m., this final edition may not contain any of Student B’s modifications (MediaWiki does include merge function that can handle this problem in certain situations). Although there was no report of this occurring in this exercise, students felt insecure about losing their wiki additions should this situation arise (Augar et al., 2005).

In fact, it can be noted that the two main concerns of content deletion and simultaneous editing were well highlighted by the students in the feedback, but in reality, there was not one incident that occurred to validate their anxieties. Leuf and Cunningham (2001) call this phenomenon the open-edit issue. The fear of losing work or having to create a backup of their input dissuaded students from believing the wiki environment was secure.

Facilitation

The wiki icebreaker exercise had a dual purpose of introducing the students to the other members of their group and to their instructor. Eighty-three percent of students surveyed felt that they got to know their instructor a little better through completing the icebreaker exercise as shown in Figure 7 (Augar et al., 2005).

The icebreaker focused on providing an interactive way of promoting online socialisation, which constitutes the second phase of Salmon’s five-stage model of facilitation presented earlier in this chapter (Salmon, 2003). Facilitators not only introduced themselves by participating in the exercise, they modelled appropriate social presence and encouraged group interaction (Augar et al., 2004b; 2005).

In parallel to this exercise, technical support was provided to students via e-mail and FAQ by wiki administrators. This ensured that students could access the wiki quickly and easily. Student user accounts were created prior to the start of the semester, however, there were ongoing enrolments throughout the duration of the wiki icebreaker exercise. This made quick administrative responses to student requests for account creation imperative to ensuring that phase one of Salmon’s (2003) model involving access and motivation was not jeopardised.

Social Context

The goal of the icebreaker exercise was to encourage students to socialise with their online group members. Eighty-seven percent of students surveyed felt that the wiki exercise helped them
get to know their group members a little better as shown in Figure 8 (Augar et al., 2005).

Observation indicated that students contributed actively to most questions in the icebreaker exercise. The most popular questions (gaining responses from virtually every group member) were those that asked if students spoke another language and in what suburb or country they resided. In addition, 68% of students placed some text or pictures on their user page to introduce themselves to the group (Augar et al., 2004b; 2005).

All students signed their posts; most used the hyperlinked signature tool supported by the SITWiki toolbar. Over half the students changed their hyperlinked signature to their preferred name; a third left it as their default wiki username; and less than 10% of students chose not to use the signature tool (Augar et al., 2005).

Some interesting trends were observed among the groups of students who did not use the signature tool to sign their posts. One group commenced each individual post by including their preferred name plain text and a colon; their post would follow this signature (this format is common in synchronous chat programs). Another group hyperlinked signatures to introduce themselves under the first icebreaker statement and then signed the rest of their posts using plain text. In these instances, it was noted that rather than adopting the format modelled by their instructor, students used the format modelled by the first student to make a post. This trend can be perceived as indicating the emergence of a group culture (Augar et al., 2005).

**Shared Learning Goal**

The icebreaker exercise focused on online socialisation and introducing students to online learning in a fun and informal manner. Consequently, the development of a shared learning goal relating to the subject matter did not occur. However, some students felt that the socialisation did enhance (if only slightly) their ability to communicate with their group throughout the semester, as shown in Figure 9.

**Wikis in Review**

The wiki icebreaker exercise showed that MediaWiki is a reliable and usable technology for supporting collaboration among large groups of students. However, research indicates that the SITWiki technology should be improved for future use.

Students were not comfortable with the possibility of losing work. Developing a short-

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**Figure 8. Students rate whether the icebreaker helped them get to know other group members**

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>13%</td>
</tr>
<tr>
<td>Slightly</td>
<td>34%</td>
</tr>
<tr>
<td>Somewhat</td>
<td>38%</td>
</tr>
<tr>
<td>Definitely</td>
<td>15%</td>
</tr>
</tbody>
</table>

**Figure 9. Students rate whether the icebreaker enhanced group communication throughout semester**

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>15%</td>
</tr>
<tr>
<td>Definitely</td>
<td>9%</td>
</tr>
<tr>
<td>Somewhat</td>
<td>26%</td>
</tr>
<tr>
<td>Not really</td>
<td>50%</td>
</tr>
</tbody>
</table>
streamed multimedia training video (supported by text- and graphics-based explanations) that explains the backup and security procedures in place may make students feel more secure. Similar training resources about what a wiki is and how to use it effectively may also make the wiki easier to use.

In addition, resolving the possibility of data loss through inadvertent synchronous editing could further enhance the perceived security of the wiki. This issue could be addressed by providing either alerts to the user that a page is being edited, or by locking a page while it is being edited to ensure no data can be lost via synchronous editing.

Future research aims to further explore the community building potential of wikis by using them to facilitate student creation of collaborative knowledge repositories. Research will explore whether using a wiki in document mode empowers students with a sense of ownership that fosters a sense of community in the learning group.

Using Online Lectures to Support Virtual Learning Communities

This section introduces online lectures. It explains how they work and describes a pilot study involving online lectures recently completed at Deakin University. This pilot study explores the use of video and audio lectures to enhance the delivery of distance education. A long-term aim of this ongoing research is to explore whether the inclusion of audio and video lectures enhances the sense of community felt by distance education students (DES). Another goal of this study is to determine whether or not the students’ ability to “see” the lecture theatre and lecturer and to “feel” the experience as if they are a part of the lecture enhances the development of a community spirit.

Online Lectures

Video lectures are the display of lecture material in a visual context. Video lectures can be delivered in several different formats, such as recorded video files available for download, broadcast or streamed real-time video lectures, and video conferences. Video lectures can be stand-alone, individual video files, or they can be teamed with other media applications such as PowerPoint presentations.

Audio lectures convey on-campus lectures using text-based lecture materials with the addition of audio files. The audio lectures can consist of purely audio recordings or they can also include other media applications such as PowerPoint presentations or static video. The audio recordings can also be provided in several different formats such as audio cassette tapes, downloadable digital audio recordings (e.g., wave files or mp3 files), and online audio streaming.

Enhancing Distance Education at Deakin University

Distance education students at Deakin University have in the past received a hardcopy of text-based lecture notes, study guides, and readers via the postal service to help them complete their studies. Video and audio lectures have been used on occasion in the delivery of distance education units at Deakin University. However, they were made available to students via video tapes and CD-ROMs. The current pilot study extends this idea by exploring the provision of video and audio lectures online for students to access.

The provision of video and audio lectures can benefit students in many ways. It can allow students to:

- review lecture material they did not understand at the time of the first delivery;
- add to, or amend the notes they had taken in the lecture;
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- catch up and take lecture notes from any lectures they had missed;
- revise the lecture at times more suited to their life style; and
- allow DES access to material which was previously unavailable to them (Lanham & Zhou, 2004b; McCrohon, Lo, Dang, & Johnston, 2001).

The learning styles and approaches of individual students can vary widely (McCrohon et al., 2001). The use of video lectures caters to the needs of students with a visual learning style, just as the use of text-based lecture notes caters to students with a preference for learning from text-based materials.

It is apparent that an increase in the use of visual material would be beneficial to English as second language (ESL) students. Studies support this contention and acknowledge that Korean, Chinese, Arab, and Filipino students are more oriented toward visual learning styles than Anglo students (Park, 1997; Reid, 1987) cited in (Park, 2002). Students from non-English speaking backgrounds may find lectures easier to understand when the visual and verbal cues are combined in video streaming (McCrohon et al., 2001). When static images are used in conjunction with text, it attracts the learner’s attention, aids knowledge retention and recall, and acts as a clarification tool when verbal forms are insufficient (Duchastel & Waller, 1979, as cited in Asensio & Young, 2002). These studies all indicate that the inclusion of video and audio lecture materials can enhance the learning experience of ESL and international students.

As discussed in an earlier section of this chapter, Deakin University has a culturally diverse student body with a large number of international students from Asian countries. It is envisaged that providing these students with visual alternatives to text-based learning materials will create a more culturally inclusive learning environment, thus enhancing the delivery of distance education at Deakin University.

The Online Lecture Pilot Study

This pilot study involved the participation of students studying a tertiary subject as part of an Information Technology Master’s Degree. Students can study this subject in either on-campus or off-campus study modes. Previously, text-based lectures notes for this subject were provided to all students online using DSO. The goal of introducing online lectures was to provide all students with access to the “physical” lectures via the Internet, and to document their interaction with the lectures provided.

The pilot study was conducted in two stages. The first stage dealt with the creation and implementation of the video and audio lectures and the provision of student access. The lectures were created in both video and audio formats in order to determine which format would suit the students’ learning requirements.

The second stage of this pilot study was the completion of an anonymous survey, in which students recorded their experiences and opinions regarding the online lectures. This pilot study was primarily concerned with discovering the most efficient and usable technologies for the delivery of lectures online. Future detailed studies will explore the effects that video and audio lectures have on building culturally inclusive learning environments and supporting virtual learning communities.

Producing Online Lectures

Several lectures were recorded (via audio and video devices) during the second semester in 2004. These recorded lectures were then made available to students in streaming format via the Internet, and the Deakin intranet. Providing the video and audio lectures in streaming format meant that the students did not have to download
the files to their personal computers. They could simply view the information as it streamed from the University’s server.

The audio lectures were recorded using an audio recording device such as Mini-disk player. The files were then transferred from the audio device to a PC where they were edited and then converted into either a wave or mp3 file. Once transferred, the complete audio files (approximately 45 minutes in length) were edited and then modularized into smaller files (approximately 1 to 5 minutes in length). The modularized files are then linked to their corresponding topics contained in the lecture material (Lanham & Zhou, 2004b). The unit lectures were delivered on-campus by lecturers using a PowerPoint presentation. The synchronized audio files and PowerPoint slides were then transferred to DSO where they could be accessed by students.

Streaming video lectures were also provided in conjunction with a PowerPoint presentation to enhance the delivery and clarity of the lecture content. The video files were captured by using a Mini-DV (digital video) camcorder, and the files were then transferred to a PC via a Firewire cable (IEEE 1394). The files were imported from a camcorder into Microsoft Windows Movie Maker and then encoded into MPEG-2 movie files.

Once the MPEG-2 file was encoded, it was transferred into sofTV© (XStream Software, http://www.softv.net/Public/index.asp) so that the PowerPoint slides could be synchronised with the corresponding video content. This synchronisation process ensured that the slide show could run independently without user involvement, which enabled the students to avoid having to familiarise themselves with the sofTV© program.

**Results**

Results were gathered immediately after the first online lecture was made public. At that time, a brief survey was conducted focusing on the student’s ability to access and interact with the online lectures. The questions covered issues that included accessibility, usability, quality, and usefulness to their studies. The majority of students who responded to the preliminary survey were enrolled in an on-campus mode and were male, international students aged between 20 and 25. There were no female respondents to the survey.

The students were able to access the online lectures at their convenience and as frequently as they required. It is interesting to note that, of the students that responded to the survey, only one student stated that he had not used the online lectures more than once. The other participants indicated that they had used the online lectures on several occasions.

All of the students who completed the survey indicated that they would use the online lectures again, that they found the online lectures helpful in their studies, and that they thought the inclusion of video materials in the future would be worthwhile.

The pilot study indicated that students would appreciate the use of online lectures in the future. The high level of use exhibited by on-campus international students indicates that off-campus, international, and DES might also benefit from the use of online lectures in the future.

**Online Lectures in Review**

The predominantly text-based existence of DES has often led to feelings of isolation, solitude, and the absence of connection with other students. The use of video can put a face to the name, and give a voice and actions to otherwise static text. These features combine to help create a virtual lecture environment for the DES and off-campus students.

The importance of actually seeing who is responsible for the delivery of the subject content can help to promote a sense of physically being in the lecture. Further exploration into the role that video may play in the support of virtual learning communities...
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communities is planned for implementation in the first semester 2005. This research will explore the benefits that online lectures provide to students, how they support different learning styles, and their impact on learning for students from diverse cultural backgrounds.

Future Directions for Virtual Learning Communities

The two studies outlined in this chapter use wikis and online lectures to support the creation of virtual learning communities. As technology evolves, many more affordable and accessible means of community building will become available to developers. The focus of future learning communities will be in bringing the community to the student and providing enhanced learning materials that take advantage of the latest technology and support the range of learning styles that exist within the learning community.

The research presented in the wiki case study outlined the possibility of providing e-mail alerts to students to notify them of recent activity and encourage them to return and contribute to the learning exercise. In the future, Short Message Service (SMS) may be the preferred technology. While enthusiastic students may check their e-mail every day to keep abreast of updates, e-mail cannot provide the instantaneous real-time alerts to students that SMS can. SMS can provide students with a sense of connection to their community, reminding them of important deadlines, and studies indicate that students appreciate the use of SMS as a means of communicating with their instructors (Horstmanshof, 2004).

As bandwidth increases and Internet access costs decrease, the provision of multimedia and streamed resources to support diverse learning styles has become a viable option. Virtual learning communities based on discourse about subject matter can be daunting for some students who have difficulty absorbing information provided in a text-based format. The provision of alternatives such as video or audio lectures, animations, and the like can make learning more accessible and enjoyable for students.

Additionally, where time differences are not an issue, some virtual learning communities are already moving away from text-based discussion forums. Real-time video and audio conferences between students and instructors have the potential to further enhance the social presence and sense of belonging felt by community members. Using video and audio in teaching materials and forums provides students with a more personalised and authentic learning experience. Putting a face and a voice to their instructors and peers can help them to feel less isolated and provide a richer learning experience, enhancing the sense of community and inclusion provided by the e-learning environment.

CONCLUSION

This chapter has introduced virtual learning communities and discussed their key criteria: social context, facilitation, technology, and shared learning goal. Essential theory relating to the pedagogy of virtual learning communities clearly supports the validity of such communities and their benefits to the e-learning arena and to distance education in particular. The focus of the chapter was, however, building virtual learning communities. Research results and case studies, such as DSO and SITWiki, were presented and analysed to show practical examples of how e-learning environments can be developed into virtual learning communities.

Having read this introduction to virtual learning communities, it is now left to the developer to innovate and create the virtual learning communities of the future.
REFERENCES


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