

# **A Framework for Technology Selection in a Web-based Distance Education Environment: Supporting Community-Building through Richer Interaction Opportunities**

Scott Nicholson

Librarianship, as a profession, relies upon a strong network of colleagues outside the institution for collaboration. The seeds for this collaborative culture are planted in library school; however, in an online environment the challenges are greater when creating that sense of community. By supporting more ways to allow students, faculty, staff, and alumni to communicate in a distance education environment, the sense of community of the school can be raised. This community building can be done either within the confines of a course (internal) or outside the course structure (external). In both cases, the concept is the same—develop more pathways through a “communication scaffold” that allow individuals who are part of the community of the school to connect. There are three dimensions to consider in developing this scaffold: Synchronous vs. Asynchronous; Facilitated vs. Non-Facilitated; and 1-way vs. 2-way. By being conscious of these choices, those working to improve interaction can try to incorporate different types of experiences in order to encourage a larger group of people to participate.

## **Introduction and Literature Review**

One of the challenges to schools offering courses online is replicating the social environment of a classroom and campus. When sharing a physical space, there are a number of formal and informal mechanisms by which students, faculty, staff, and alumni can meet. These meetings may be in the context of a course, through an informal learning experience such as a presentation, or via a purely social function. A number of scholars have emphasized the need for this community building as an essential accompaniment to the content provision.<sup>1,2</sup> In the distance education environment, however, these interaction opportunities have to be purposefully built and maintained. Therefore, the focus of this paper is to explore ways to increase the number and types of interaction opportunities in a distance

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education environment which will, in turn, allow for improved social interactions and stronger academic communities.

What is a community? Rovai explored various definitions of community and developed four aspects that can define a community: spirit, or the sense of connectedness felt by a participant; trust; interaction; and common expectations.<sup>3</sup> In a classroom, this expectation is to grow and learn. There is a community of the department or school in which a student studies as well, and this larger community is made up of students, faculty, staff, alumni, and professionals. The framework developed in this paper focuses on building the “interaction” aspect of community, as the communication technologies discussed are designed to improve interaction between students and other communities associated with the school.

This type of community building is important in any discipline in order to maintain the culture of the school. Librarians, by their nature, turn to cooperation and working with colleagues at other institutions, as evidenced by the attendance at conferences such as the American Library Association annual conference. One of the roles of library school is to introduce students into a network consisting of other students, alumni, and faculty. If a distance program focuses only on the material and not on the interaction between current students and these other groups, the sense of “professional community” is not built during these educational stages of librarianship.

For decades, educational theorists have discussed the importance of interaction and community in the learning process. For example, Vygotsky presented the importance of interaction between learning communities, as this allows students to learn through the viewpoints of others.<sup>4</sup> Wehlage, Rutter, and Smith found that, at least for traditional programs, schools with higher retention rates focused on community-building projects that built social bonds;<sup>5</sup> while this work was not placed in graduate education, the lessons could still be applied for graduate learning communities. Taking this concept further, Weigel states that content alone is not enough to provide a thorough educational experience. Interaction is what allows learners to take content and understand how it can be applied in different situations. Individuals learning course content know only their own perspective; through interaction with others, learners can become aware of multiple perspectives.<sup>6</sup> Taking this beyond a single classroom knowledge space allows learners to discover connections between course materials from different courses. Encouraging connections between students and alumni allows each group to learn from the perspectives of the other—students can share

content and learn how that content applies to life experiences, and alumni can learn about new content and ways of looking at their real-world problems through different eyes.

One of the challenges of building community in the distance education classroom is the fact that content-based discussions are just that—discussions based upon the content. Students visiting a distance education classroom can become frustrated if forums designated for content discussion become clogged with personal and social interaction. It is important for effective content discussions to be based upon a set of discussion guidelines to keep the class on task. The side effect of staying focused on the classroom tasks is that social communication is stifled; therefore, alternative opportunities for interaction need to be established in order to allow social bonds to be created. In order to aid with this, Woods and Eberole presented the concept of a “community scaffold” as the base for a distance education classroom upon which community can be built and content can be integrated.<sup>7</sup>

The communities to which a student belongs extend beyond the classroom, however. Students are members of the following communities:

- Courses—Each student is part of one community per course. Depending upon the activities in the course, the students may be in smaller working group communities within a course;
- Peer Group—Each student is a member of one or more communities made up of their peers. These groups may cross across course boundaries. In the case of a cohort model, where students all start together, then the peer group community and the courses community are very similar;
- School/department—There is a larger community to which the student belongs, and that is one made up of the students, faculty, staff, and alumni of a particular school. This community traditionally develops through physical contact with a particular space, such as a social lounge, the hallways and buildings, or school offices;
- University—The communities of schools combine to form a University-wide community. This community tends to come together around large events, shared campus spaces such as the library and student centers, and issues that affect the entire university.

Haythornthwaite, Kazmer, Robins, and Shoemaker examined the community critical to success for a peer group of students over a year of their education in an MLS program.<sup>8</sup> They found the importance of providing a variety of synchronous and asynchronous experiences, starting with an initial in-person experience and moving on to course experiences with multiple methods that elicit involvement from students. They also emphasized the importance of ensuring that students have many modes available to them to communicate with each other. The present work takes this concept, formalizes it through the development of a framework, and extends it to explore methods of connecting students to other groups, such as alumni, other students, and professionals, from the school’s community.

## Framework for this Exploration

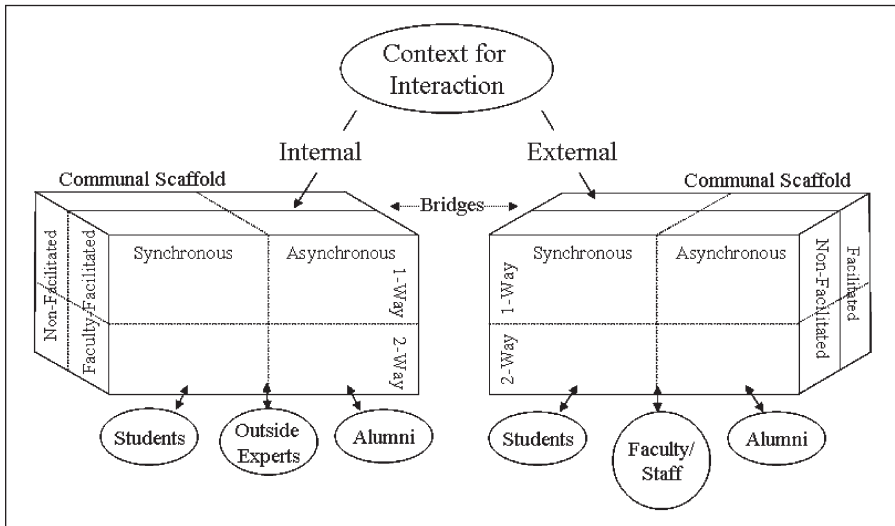
The method of development is to start with Woods and Eberole's community scaffold concepts<sup>9</sup> for a course, and expand upon them by systematically examining the different communities that come into play during the student's time with a degree program. In an in-person degree program experience, students interact with communities of faculty, staff, alumni, and professionals from the community. These interactions come about mainly through the sharing of physical space and in-person communication. In order for these same connections to exist in a distance education program, faculty members and administrators have to consciously support the connections between students and these communities. Moore's concept of transactional distance or the conceptual space between a student and a teacher,<sup>10</sup> is useful to apply here.

The goal of the community scaffold is to shorten the transactional distance between a student and these different communities related to a degree program and a school. Providing the technology for these large-scale community scaffolds can allow the community of a school to grow and strengthen, even when students do not physically visit the campus often. Building this community scaffold takes a deliberate effort that combines the need for technology selection and facilitation to replace the community-building experiences that naturally occur when sharing a physical space. Increasing virtual community-building activities can have the effects of creating opportunities for students to build strong social networks based around the college and, therefore, to become committed and involved alumni of a program.

In order to explore the technologies and situations that can allow for community building, the framework is based upon different variable levels (See Figure 1). The first variable under consideration is the context of the interaction, which can be *internal*, defined here as within the context of a specific course, or *external*, defined as those activities related to the school that are not tied in with a specific course. These two types of experiences may be on different technological platforms or on the same platform, depending upon the policies of the institution. For example, the institution may license a courseware platform such as WebCT or Blackboard. These tools may have restrictions on the number of seats available for participants; therefore, the institution will limit those seats to students enrolled in courses. In order to make these connections to a much larger and less defined user community, the school may need some type of open platform, such as a Wiki, Web portal, or other technology not tied to a specific number of participants. Ideally, the two platforms would be connected, at least so that students could easily visit the external platform and visitors could visit specific portions of the courseware platforms.

The other variables of interest have to do with the mode of interaction and the people involved in the interaction. Students, faculty, staff and alumni can interact through both synchronous and asynchronous technolo-

**Figure 1**  
 Framework for Technologies to support Community-Building.



gies; in addition, these technologies can be primarily for announcements and other one-way presentation of information or may be interactive and allow discussion and other two-way communication. The majority of the activities in the internal context for interaction have their content facilitated by a faculty member; conversely, most of the activities in the external environment do not have someone facilitating the topics of the interaction. Because there is usually no individual charged with keeping the discussion going, maintaining the external communal scaffold can be a greater challenge.

Finally, it is essential to provide bridges from the internal experiences within a course to the external communities. For example, when talking about selection policies and challenges, bringing in librarians who have gone through a challenge can de-mystify the process. Another example is providing continuing education opportunities for librarians to work with students for a self-contained module of a course. These types of activities are traditionally handled through guest visits in an in-person class. It can be challenging for a distance instructor to set up an account and traverse hurdles to bring in these individuals, so having a readily-available community scaffold can make this easier. Conversely, the external communication scaffold can be used as a publicity mechanism for increased involvement in the course-specific internal communities. By providing opportunities to make more connections between students and professional communities, both the students and the professionals can benefit. Virtual poster sessions that are open to invited groups of students from other courses, alumni, faculty, and professionals are one way to bridge these two worlds that benefit

both the students creating content through initiating networking experiences and those viewing the posters through an exposure to new information.

The advantage of starting with a framework is that as technologies change, new technology can simply replace old technology in the framework. The concepts of who will be talking with whom and in what context will remain relatively stable. Most writing on this topic has focused on the internal, or course-related, community building.<sup>11</sup> Using this framework, this paper presents not only technologies to support these internal communities but also extends the discussion to technologies that can support external communities.

## **Technologies to Support Distance Education Community-Building**

Before talking about the different contexts for community-building, some basic technologies will be introduced. In order to speed up the discussion later in the article, these will serve as definitions for these technology types. It is assumed the reader is familiar with e-mail and the World Wide Web.

### **Electronic Discussion Forums**

Many communities employ e-mail based discussion lists; therefore, students may find themselves quickly overwhelmed with these mailing lists. An overwhelming list can either be moderated by a facilitator or received in a digest format, both of which aid in dealing with a overwhelming quantity of individual messages. Many lists are combined with an archival mechanism in order to aid those new to the list or those who want to search the past. Conversely, a Web-based discussion board can provide the same type of communication with the advantage of an easily accessible archival function. Because of their nature, discussion boards are better solutions for coursework and class discussions; however, a discussion board requires users to log in and view the board in order to read new messages. Some message board software can provide users with the option to receive an e-mail when there is an update to the board.

It is important to consider the needs of the communication when selecting a discussion format—mailing lists are better for time-sensitive announcements, and discussion boards are more appropriate for longer-term discussions. The same mailing lists and discussion boards used for two-way communication can also be used for one-way communication. Most mailing list software will allow you to create a moderated list used only for announcements, and discussion boards can be created with the intention of posting announcements with only limited Q&A attached to the announcement.

### **Instant Messenger**

One technology readily available for synchronous communication is Instant Messenger (IM) software. These tools run a small program in the background of the user's computer; if two users are running this program, a message takes seconds to travel from user to user. It is similar to e-mail, although it has a much faster notification and response cycle. IM conversations are not always archived and thus should be used accordingly. There are several pitfalls in using IM software. New users may not be aware that the program is on all of the time and feel overwhelmed with messages until they learn how to become "invisible" or shut the service off. If one of the common commercial freeware IM tools is used, users may find themselves bombarded with messages and files from people not associated with the university (or even mindless robots designed to discover live people using IM services). However, these IM services can provide a level of presence not available through other technologies, replicating the "virtual hallway" in the distance education environment.<sup>12</sup> IM tools are primarily used for two-way communication.

### **Chat Room**

Frequently confused with IM, chat room services also allow one or more users to have a discussion in a shared virtual space, usually accessible through the Web. Many courseware packages have chat features built into them, and there are many freely available chat spaces on the Internet. There are several significant differences, however, between live chat and IM. IM is a "push" technology, so that messages are delivered to the computer while one is doing other tasks. In chat rooms, the user must visit a Web page or another place on the Internet and watch the screen for activity. If users switch applications on their computer, they may be unaware that others are having a discussion on the chat room. Since the chat is taking place on a server, archival settings are usually controlled by the server administrator. Wise faculty and students using chat rooms will copy the discussion on regular intervals and paste them into an external document in case of a system crash.

Chat rooms can be better than IM for large-group discussions, and some courseware packages provide tools for facilitating these potentially chaotic discussions. Without a few basic guidelines to participation, new participants to a chat environment may feel overwhelmed or may unintentionally dominate a chat with constant replies to each statement made. Based upon the intent of use, chat rooms can be used to support primarily one-way communication (such as a lecture or guest speaker with limited interaction), but are more commonly used for two-way (and many-way) discussion.

### **Multimedia Communication**

Synchronous multimedia communication is available through video broadcasting through a Webcasting setup, ranging in quality from a PC with a microphone, such as Internet Radio, up to a high-quality camera and feed at an



on-campus studio. By using a synchronous broadcast, participants can join in on the event live over the Internet, and through the use of a chat room or Messaging tool, can ask questions during the event. In addition, these live events can be archived and provided for participants to enjoy at another time.

Finally, audio and video technologies have been integrated into IM and chat rooms. Many currently available IM tools make it easy to turn on a PC video camera or microphone and allow for richer communication than just through text. In addition, chat rooms where each participant appears as a talking head in a small video box, such as CUSeeme, can be a chaotic, but entertaining, way to all sit around the same virtual table.

### **Integrating the Technology with the Framework in different Contexts**

To complete the framework, the context for the communication is combined with the type of interaction and the communication technologies. In addition, this context will allow those creating a community scaffold to consider the differences in application to different sections of the communities related to the school. The two contexts will be the Internal context, or those activities which take place within a specific classroom, and the External context, or those connections made with students, faculty, alumni, and professionals outside of the classroom. Each of these contexts presents a different set of challenges. It is also important to consider how these two areas will be able to be bridged through pointers, common Web spaces, discussion forums, or other shared communication technologies.

### **Course-Related (Internal) Interaction**

In looking closely at Internal interactions, there is an additional variable to add into the model. The interaction can be related in some way to course content or it may be completely unrelated to course content. There will undoubtedly be blending of the two, as a discussion moves from course-related material to non-course related material or a live chat set up originally as a social hour moves into a discussion of course material. Therefore, when designing these interaction experiences, the faculty needs to consider trying to keep a balance of both course-related interaction and non-course related community building communication opportunities.

Some programs deal with the community-building activities through a required in-person residency period at the start of the course, but then may not provide the communal scaffold needed to support the continued growth of the community. This results in students who had once enjoyed a rich blending of content and community during the residency faced with a content-only set of interactions for the remainder of the course. While an in-person meeting certainly builds community, and may be one of the fastest ways of doing so, the focus of this section is on the methods and technol-



ogies for interaction and building community outside of direct physical meetings.

### **Communicating with Faculty**

The traditional method that students use to communicate with faculty in Web-based distance courses is e-mail. While this might be the de facto standard for distance communication, it can take a significant amount of time without adding anything to the overall sense of community for the course. Other forms of faculty to student communication can save time and/or provide more benefit to a larger group of students. Faculty can create a “Questions for the Professor” discussion board and encourage students to ask questions in that forum whenever possible. This allows the faculty member to answer a question once and all students benefit, and greatly reduces the amount of e-mail that is received. In order for this discussion board to be successful, the faculty member must monitor this board regularly so that the students can rely upon this method of communication.

If the student does require individual attention from the faculty member, Instant Messenger software may allow an immediate connection and answer the student’s need. In fact, some students report that seeing a professor available via IM provides a sense of community, even if the resource is never actually tapped.<sup>13</sup> Another quick solution to a complex e-mail question can be a telephone call; five minutes on the telephone can save thirty minutes of typing. Neither of these solutions provides the built-in archiving that e-mail allows, but both can be used to deal quickly with the needs of students.

Faculty members traditionally provide content to their students through prepared lectures (commonly through synchronous or asynchronous text, audio, and/or video) and facilitating discussions. While options such as audio and video may be unwieldy for delivering all of the course content due to file size and difficulty in quickly editing content for re-use, they provide students a much better idea of the personality of the instructor. One way to balance these issues is to create small weekly videos that have no course content, but replace the pre- and post-course casual discussion in traditional classes that serve to help students become more comfortable with the instructor. These files will be small enough that most users can download them over a slow modem connection, but improve the richness of the course experience for students.

Synchronous options for faculty to student communications can aid in raising the student’s perception of the community of the classroom. Live chat sessions, while being the primary content delivery mechanism for some distance classes, can be chaotic and frustrating for both students and faculty. There are chat interfaces that allow more control over large-group chats, with control over who can post a question; similar control can be established through a set of guidelines delivered before the chat about protocol to use when asking a question. If possible, greater success in live chat can be had through breaking the students into much smaller conversational

groups or using conference call technology to set up a synchronous voice discussion with a group of students.

Broadcasting of multimedia material (currently known as Webcasting), traditionally used in courses where the faculty member broadcasts a “talking head” while responding to student questions, is another traditional way of providing synchronous distance education. One possibility in providing classes to both on-campus and distance students is with a combination of a video-based chat during the lecture time and Web-based components for discussions.

### **Students Meeting Other Students**

Typical communication between students in contemporary distance courses involves public discussions asynchronously through discussion boards or mailing lists, or synchronously through chat rooms. These facilitated discussions replace the traditional classroom discussion. Courses with a group component can provide students with a private discussion forum, shared file space or chat room as an alternative to requiring a multi-way e-mail discussion. However, a social component not necessarily related to course material develops during a physical class meeting that needs to be replicated in the distance environment if the sense of community is to be strengthened.

In order to do this, the communication scaffold needs to be built to allow non-facilitated discussions between students. Discussion boards called “Questions for Other Students” and “Informal Communication” can be created to allow students a space of their own within the structure of a course. Live chat “social hours” and IM software can provide synchronous pathways for students to network. Students can be given server space and encouragement to share personal Web pages or pre-recorded audio/video clips in order to aid social growth. Enterprising students may choose to create discussion boards, mailing lists, or other non-facilitated communication spaces on their own outside of the school-provided courseware platform. It is important to consider ways of supporting both facilitated and non-facilitated community building activities in developing a distance education course.

### **Alumni and External Expert Involvement**

There are two significant ways to bring alumni and others into the distance classroom. The first is by bringing them in as temporary instructors/facilitators. In this role, they would provide information to the students, and could use all of the techniques listed above to interact with students just as the faculty member does. Guest lecturer accounts can allow these alumni to talk with current students in areas both related and unrelated to course material, and students can be encouraged to follow up with the alumni after the class experience via e-mail. The other way is through a continuing education component; alumni could take classes (or be involved with portions of classes) alongside students, which would allow a number of interesting net-

working opportunities, not to mention the experiences that alumni could bring to classroom discussion.

### **Non-Course-Related (External) Interaction**

While many activities related to a distance education program center on specific courses, there is another opportunity to build community outside of the classroom. These activities are facilitated through physical proximity in an on-campus program. To replicate the same type of networking opportunities in a distance program, the community scaffold will need to be extended from the classroom-related activities in order to include a larger group of people.

#### **Physical Activities**

One overarching consideration is to look for opportunities to bring people together physically whenever possible. An obvious method is to have events when distance students are on campus for other activities. Students at the start of their program, visiting for residency experiences, or even at graduation should have opportunities to meet other students (both local and distance), faculty, staff, and alumni of the school through social activities. Extending this area, students can be put in touch with alumni who live in the local area to increase a sense of community for both parties. When faculty and staff travel to conferences, students and alumni can be informed about these trips in order to plan an in-person connection through a social meeting. Careful planning of field trips via student groups such as the American Library Association student group outside the local area can allow distance and local students to meet for the trip as well as meet any alumni in the area.

Another consideration is to look for opportunities for a hybrid physical/distance activity. A guest speaker or important meeting, for example, can be broadcast live over the Internet either to anyone logging on or to a select group of invited participants. Using some of synchronous application on the side such as IM or chat rooms can allow those not physically present to participate in the meeting. Whenever there is a speaker in the school, consideration should be given to broadcasting the event.

#### **Students Meeting Other Students**

The same platform used for course delivery can also be used for external activities. Since distance students visit the course platform regularly, tying in other forums not associated with a class can allow students not in the same class to build and maintain social relationships. This forum can either be done through a virtual student group or tied only to the school and not moderated. This concept can be extended to other forms of communication technologies, such as Chat Room and Instant Messenger. Both of these synchronous technologies require some level of facilitation to get them started; a time for the Chat Room social hour needs to be set, and user names of those using IM need to be gathered and shared. Mailing lists can

also be created to support student communication outside of the classroom. A conference call could be sponsored by the school during a set time around a pre-determined topic; this type of round-table can also allow faculty and alumni interested in a topic to talk with students. Finally, students may also create their own communication scaffold through online forums or mailing lists away from the eyes of the school. Through a virtual student group using the same courseware package as the school, distance and local students can meet online and organize activities around times when many students are on campus (such as residencies and graduation), plan trips to libraries where more distance students can attend (such as the Library of Congress), and discuss activities at state and national conferences.

### **Students Communicating with Faculty and Staff**

One challenge in building community is developing relationships with faculty and staff outside of the classroom. For local students, this rapport can be developed by visiting the school, meeting with faculty during their office hours, and getting involved with faculty research. However, faculty already taxed with online communication for courses may find taking the time for this type of communication external to class activities challenging. One option is to look to simpler technologies such as the telephone that better fit in with the “office hours” model; talking on the phone to a student will provide a greater sense of community than a brief e-mail. Through advising assignments, students and faculty can be connected; with a greater emphasis from the school about the importance of this type of external communication, faculty can reach out more often to help build community. As the technology becomes more prevalent, faculty may look to video-based chat technology in order to add another level to communication with students; video chat technology takes no more time than a telephone call, saves money in telephone bills, and provides a much richer experience.

### **Faculty and Staff Working with Each Other**

As the pool of adjunct faculty grows beyond the local reaches of the school, the external community scaffold will need to be extended to include these personnel in the community of the faculty and staff in residence. If these adjunct faculty do not perceive themselves as part of the community of the school, then they will not be able to convey that community to the students. Therefore, it is important to seek ways to include adjunct faculty in the community of the school. The same technologies presented here can be used to encourage faculty and staff to meet—the courseware platform used for classes or another Web-based community forum can be used to create a space for support and community-building. The advantage of this type of solution is that it is more convenient for those teaching classes using this platform; however, the disadvantage is that faculty teaching only in residence may never check the distance education courseware platform. A mailing list may be another solution that does not require someone to visit a

Web site; however, many instructors are already overwhelmed with mailing lists.

It may be that one-way communication from the school to the adjunct faculty would help them feel more part of the culture. A common problem is that information distributed in residence is not also distributed to distance faculty. Without knowledge of the activities of the school, major decisions made during meetings, public relations campaigns, and other school activities, adjunct faculty have no way of being part of the school. An announcement list for all faculty and staff used to distribute regular updates for the school may serve to keep adjuncts informed without depending upon the type of interaction that an online forum would require. Ideally, there would also be a forum available for those wishing to discuss matters or voice opinions; therefore, supporting both a one-way announcement list and an interactive forum for all faculty and staff allows individuals to remain easily informed about school matters while still having a place to interact.

### **Alumni and Professional Involvement**

The final areas for consideration are ways to keep alumni in touch with the school and with each other and to create more connections between the professional world and the students. This requires the highest level of facilitation and publicity, but can reap great rewards for the school. One of the problems with both local and distance programs is that students scatter after graduation. With no community scaffold in which to participate, there is little chance for the alumni to have continuing participation with the school. Having several different types of participation available will allow a larger group of students to feel part of the community of the school. A virtual student group can be a perfect conduit for student to alumni relationships to develop.

The same technologies that have already been presented can be used here as well. Two mailing lists—a one-way announcement list and a two-way discussion list—can provide alumni with both information about school activities and a place to discuss the school and upcoming events; some alumni who might not want to be part of a high-traffic list may opt in to a lower-traffic announcement-only list. A forum, either through the courseware platform or a similar tool, can provide the place for interactive discussion as well as provide a portal to content provided by the school (provided by faculty from current courses) for continuing education purposes. However, the application of those technologies might be difficult if the courseware package is tied to individuals currently involved with the school; therefore, there should be a transition plan to move students from the communication tools used for students to the communication tools designed for alumni.

As this scaffolding becomes a part of the lives of the students, the next step is to look at more ways to connect the profession to the students. The scaffold can then play two critical roles—that of connecting people involved with the school to each other and also of serving as a transition point

to connect students to the profession and to encourage them to stay involved with the school. Many professional organizations, local library systems, library cooperatives and other groups of professionals that will be home to future grads would welcome the opportunity to be part of the on-line life of the school. They can provide students with information about their groups, career and networking possibilities, and answer questions about the “real world” after graduation. In exchange, they get to know more about upcoming graduates and will find it easier to recruit students into their organizations if they were involved during the student’s educational process.

**Putting the Framework Together**

The framework developed in the first part of the article can now be used in conjunction with the technologies and the contexts in order to create the complete framework. Technologies will change over time, so those looking to determine which new technologies to use can see where they fit in this framework and then consider if the new technologies offer something that doesn’t already exist. Table 1 shows a summary of the framework developed in this article, with representative technologies listed in each cell of the framework. In order to reach a large number of students, staff, faculty, and alumni, a variety of communications should be used from different areas of the framework.

**Table 1**  
**Technology Framework for Community Building in Distance Education**

<b>Internal Interaction (Course-related)</b>		
	<b>Synchronous</b>	<b>Asynchronous</b>
Facilitated	<p align="center"><b>1-way</b></p> <p>Webcasting (Streaming audio/video) with or without a simultaneous local class.</p>	<p align="center"><b>1-way</b></p> <p>Material delivery through text, HTML, or non-streaming multimedia such as Impatica, Real, Windows Media, Quicktime, MP3, etc.</p>
	<p align="center"><b>2-way</b></p> <p>In-Person experiences (residency); Structured live chat (text/audio/video); Structured conference call.</p>	<p align="center"><b>2-way</b></p> <p>Discussion Boards / Mailing Lists.</p>
Non-Facilitated	<p align="center"><b>2-way</b></p> <p>Unstructured live chat (text/audio/video); Conference call/Telephone, Instant Messenger.</p>	<p align="center"><b>1-way</b></p> <p>Student Web pages; Student audio/video introductions.</p>
		<p align="center"><b>2-way</b></p> <p>Discussion Boards/Mailing Lists; Electronic Mail; Private group working areas.</p>

(continued)

**Table 1(continued)**  
**Technology Framework for Community Building in Distance Education**

<b>External Interaction (Non course-related)—to connect local and distance students, alumni, faculty, and staff</b>		
	<b>Synchronous</b>	<b>Asynchronous</b>
Facilitated	<p><b>1-way</b>  Presentations by faculty, alumni, or guest speakers (live during residency experiences or Webcasting)</p> <p><b>2-way</b>  Structured live chat (text/audio/video); Student research poster session (during residency periods); Conference call roundtable discussion</p>	<p><b>1-way</b>  Information delivery through text, HTML, or non-streaming multimedia such as Impatica, Real, Windows Media, Quicktime, MP3, etc;  Announcement-based mailing lists.</p> <p><b>2-way</b>  Discussion Boards/Mailing Lists (run by school or by virtual student groups); Forum for faculty/adjunct/instructor communication</p>
	Non-Facilitated	<p><b>2-way</b>  In-person social activities (alongside residencies or during conferences and student trips)  Unstructured live chat (text/audio/video); telephone calls or video chat for advising;  Instant Messenger.</p>

## Conclusion and Future Research

The result of this exploration is a framework to aid in the development of a community scaffold. This community scaffold concept will serve to connect students, faculty, alumni, and professionals in a distance education environment. This community infrastructure will not grow without administrative or staff guidance, as most instructors are focused on providing the Internal communication scaffold for their students during a single course experience. Creating something that connects students from many different classes between semesters that also integrates alumni, other faculty and staff, and the professional community will require significant time and effort outside the normal class-based distance education experience. This framework will guide those developing these school-wide community scaffolds in selecting appropriate technologies for communication between different groups.

The next steps in the development of this framework involve the valida-



tion and simplification of the model. Most cells in the matrix have several possible technologies that provide similar communication methods. Systematic exploration would allow better technology selection and determine which types of technologies are most appropriate for different groups. It is possible that the number of dimensions in the model can be reduced by discovering a small subset of communication pathways that satisfy a large number of communication needs. Too many simultaneous communication channels can confuse participants and can be difficult to keep up with; too few channels, and potential members of the community will be left out. Therefore, it is important to discover an effective subset of communication channels that still meets the needs of most groups in the school's community.

Another area of focus for research concerns bridges between the Internal and External contexts. Because of the nature of many courseware packages, the course-related communication tends to be locked away behind passwords. There may be portions of the course content or course discussion forums that could be presented to a larger community; however, there may be reading materials and databases that are under access restrictions due to copyright. Instructors and students may be unwilling to share large amounts of their intellectual property through sharing assignments, lectures, or forums that were originally created as class-only resources. To be successful, the External context requires more open communication methods without as many levels of security. The challenge of bridging these two with appropriate consideration for copyright, intellectual property, and security is a fertile research area.

In conclusion, there are not different or novel technologies presented in this work; almost everything can be done through e-mail, discussion lists, courseware packages, and synchronous tools like the telephone or Instant Messenger. The important lesson is to remember the different contexts in which community building can take place and the level of facilitation that each requires. As this community scaffold is constructed and strengthened, those involved with the school will be able to easily locate the places for meeting virtually. With a constant vigilance for opportunities for physical meetings between students, faculty, staff, and alumni to support these virtual spaces, the community of the school can be felt by those who rarely spend any time on campus. In addition, adding this community scaffold allows students to feel part of a community of library colleagues, which will be beneficial to them throughout their careers.

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