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# Creating and nurturing distributed asynchronous learning environments

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## Abstract

The introduction of Web-based course instruction into an existing degree programme offers the opportunity to re-examine models supporting learning and the transfer of knowledge among students enrolled in such courses. By removing the barriers of time and place, instructors can create and sustain student learning communities supported by interactive communication tools grounded in asynchronous learning models. The instructor's role moves to that of a facilitator who seeks to stimulate interactions between students and between students and the instructor, in the pursuit of improved learning and knowledge base construction.

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## Introduction

During the fall semester of 1998 and again in the winter 1999 semester, the University of Missouri School of Information Science and Learning Technologies offered a Web-based distributed course (IS334 – “Library Information Systems”) supported by asynchronous communications tools. A total of 60 students were enrolled in these two courses. Of those students, only a handful were in-residence, the remainder being off-campus and, in some cases, out-of-state. Each semester's offering of the course provided students with the opportunity to participate in project-based learning experiences.

Approximately five projects were gathered each semester, with five to seven students forming each project group. Communications, both synchronous (chat) and asynchronous, were supported by FirstClass™ a client-server based proprietary communications tool.

This article focuses on the evolution of that course from a face-to-face experience to a Web-based asynchronous learning environment. The authors, an instructor and his graduate teaching assistant (TA) chronicle the design and development of this asynchronous learning environment giving emphasis to the establishment of a student learning community independent of distance and time. Of special interest is the fact that this learning community continued well after the course and the semester had ended. Another noteworthy fact is that the instructor and his graduate TA were based in two different universities for the second course.

This paper will also discuss collaborative arrangements initiated by students operating in project groups attempting to meet the objectives of each project group. Collectively, the projects were melded together into a single cohesive set of Web pages by the instructor and the TA. Insight into the asynchronous interactions between students engaged in class discussions and group projects will be presented as they relate to the learning objectives set forth by the instructor. This paper will attempt to qualitatively document how asynchronous communications might support increased student learning and collaborative opportunities representative of those professional team problem-solving tasks

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in which student learners will likely engage upon graduation.

### Cognition and learning

What does it mean when we say we “know something”? How do we learn things? And how do we use those things we learn? The field of cognitive research has long sought the answers to these and related questions. It appears there are three prevailing themes, or schools of thought, regarding learning within an educational institution.

There are those who feel constructivism, as set forth by Piaget (1970) and Vygotsky (1978), creates learners who are builders of their own knowledge. This would set the instructor’s role as that of a facilitator, who, rather than merely putting information into the head of the student, creates an environment where students themselves can arrange existing knowledge and create their own learning constructs. This is a far more complex matter, challenging the academy to create and nurture such a learning environment.

Another theme attempts to understand better how learners actually learn and whether these capabilities can be taught to other learners to improve their abilities to benefit in situations involving the transfer of knowledge. Chi *et al.* (1989) found that successful learners apply certain general learning skills more often and more effectively than do those who are less successful. Unfortunately, findings indicate that strategies taught directly to students do not tend to be used spontaneously under conditions different from those in which they were originally practised (Brown *et al.*, 1989; Resnick, 1987).

There is a growing interest in the notion that learners do not learn as individuals, but from a process distributed among various people in combination with other supportive resources, including those in print and digital format. This distributed nature of cognition and learning has been promoted by Brown *et al.* (1989), Pea (1993), and Resnick (1987). Their research has indicated that thinking and learning are situated in a context of intentions, social partners, and tools for communication. These distributed bases of knowledge (persons and resources) can be either synchronous or asynchronous and, as such, are potentially supported by

communications tools built for the purpose of fostering such group development.

It is this last approach, where student learners and digital resources are connected using asynchronous communications tools, with which we are concerned in this study. To understand this interaction of people, resources, and tools further, let us consider the predominant thoughts regarding distance and distributed learning in higher education today.

### Distance learning and distributed learning

The term “distance learning” is often used to describe learning environments centring upon the physical separation of the learner, or a group of learners, from the source of learning. That content source may originate from an instructor, a guest lecturer, or from a source of recorded knowledge. In the classic model of the instructor as expert (a.k.a. “the sage on the stage” model of instructional delivery), it is possible to create a digital environment, supported by Internet access, that in fact replicates this model of delivery to a “distanced” audience. In such situations, the classroom becomes virtual, but the learning experience still rests squarely on the shoulders of the instructor. Informational resources include text materials, the instructor’s knowledge base, and additional supplemental resources, many of which can be found online. Such courses, whether delivered in analogue or digital format, often have a beginning, a sequence of topics to be covered, various assignments and/or projects to be completed, and a defined ending point. They are generally constrained by the semester model of learning, which assumes that learning occurs within bounded time constraints, and at certain points along the way, specific concepts and factual knowledge should be mastered by the student. In short, distance learning opportunities are often designed and carried out as structured sequential learning processes, with the delivery mechanism being either analogue (generally in real time, as in the case of audio-video transmissions) or digital (generally asynchronous and Internet- or Web-based), or some combination of the two. In describing the various kinds of distance learning arrangements, the focus is often on delivery mechanisms, providing convenience and flexibility in support of students who

reside at some distance from the traditional campus setting.

Alternatively, the term “distributed learning” is often used to describe a learning community with multiple sources of information, including the students themselves. The focus is not so much on delivery mechanisms as it is on learning experiences and resources in support of student interactions and learning. These include both synchronous and asynchronous tools in support of information exchange. As with distance learning environments, distributed learning environments can be offered to student learners who are not bound in a physical sense by a classroom with fixed time slots. Nor are they limited by learning opportunities that must be sequenced linearly. On the surface, distributed learning may seem unstructured when compared to traditional modes of teaching and learning. To the student learner, this environment appears to be discovery based, and hopefully engaging. Distributed learning need not be a set of pre-established topics that a student can move through in a sequential fashion, remaining passive with regard to the content as it is presented for consideration.

### Student learning communities and the traditional classroom

The phrase “student learning community” describes a new mode of communication, interaction, and learning experiences among students and instructors/guides, typically supported by connections to the Internet. A learning community is a group of people (students and instructors) bound together by shared learning experiences. The ideas behind learning communities were first proposed by Alexander Meiklejohn in the late 1920s (Gabelnick *et al.*, 1990). Through the creation of the Experimental College at the University of Wisconsin in 1927, Meiklejohn advocated the learning community as an environment in which “[students were required] to develop a personal point of view, to connect the ideas in the classroom with the ‘real world’” (Gabelnick *et al.*, 1990, p. 11).

John Dewey built upon Meiklejohn’s work. According to Gabelnick *et al.* (p. 15), “[Dewey’s] contributions had less to do with structure [of the learning community] and more to do with the teaching and learning

process, especially student-centred learning and active learning.” As Dewey proposed, the educational process is “based upon an attitude of ‘shared inquiry’ . . . where the teacher is now a partner in the collaborative relationship [with the student]” (Gabelnick *et al.*, 1990, p. 16). Within these communities of shared inquiry, the learning process itself is distributed across the community members, providing students with an environment for individualised instruction. Students and community members give and take information, knowledge and insight that is irrelevant to their needs rather than attempting to predict all of their learning needs through predefined constructs.

Communication tools supporting student learning communities can be both synchronous and asynchronous, depending upon the situation and the need for interaction. Such tools can support one-to-many and one-to-one interactions within the same application. These applications and interactions are essential for the establishment of a truly distributed interactive environment, one unbounded by time and location.

Meadow (1998) comments on the effect of the information technologies on education and learning:

By participating in communications networks . . . students can be freed from the stultifying effects of lockstep education in which everyone does the same work at the same rate, frustrating alike the quick and the slow students (p. 221).

Over the course of their careers, most information professionals will likely find themselves collaborating with an array of other professionals, many of whom will not reside in the same location and may not be available to interact at the same time. This new breed of professionals will need to develop skills in working and collaborating asynchronously and at a distance in order to accomplish their collective professional objectives.

Musser *et al.* (2000) note two recent fundamental changes in the conception of the educational process:

First, cognitive psychology is increasingly revealing a picture of learning grounded in active participation, constructed knowledge and the importance of the situation and context not only for what is learned, but for how it will be able to be used. These new theoretical underpinnings, as well as other forces, argue for learning through problem solving, authentic projects, and learning communities.

The second fundamental change to education comes from advances in technology with a special emphasis on network technologies and in particular the Internet. With dramatic advances in networking and processing capabilities new tools of mediation, simulation, modelling, and communication are possible. We now have the potential to design teaching and learning which is far less bounded by time and distance and restricted by the limitations of a classroom. Teachers and learners can connect in many different ways offering new opportunities for learning in context, for richer means of communication and sharing, and for new means of performance and self assessment (p. 90).

In traditional teaching, the classroom is the dominant feature, and the class and related coursework become the unit of production, rather than the individual or the learning process. Often, the focus is on the instructor as the primary source of information, supported by texts and journal articles as evidence of external knowledge or expertise. The application of technology to education should have as its goal the enhancement of the method and the means of learning. In doing so, it is possible to alter higher education (Musser *et al.*, 2000, p. 92). In the case of graduate education, students often progress at some prescribed pace, starting with core required coursework and moving through a sequence of electives as determined by their advisors. The assumption is that all students have the same starting and ending point, and the process in between is designed to move them along a pre-defined path at a set rate, bounded by semester or quarter sessions. This is not always, and perhaps should not be, the case.

As Musser *et al.* (2000) state:

Technology can be used to liberate students from the factory line process of learning. Using technology the opportunity exists to make learning an individual experience that takes place any time, any where, and at any point in a person's life. Technology offers to alter the focus of what is being taught, as well as how it is being taught, to facilitate a student's development at higher cognitive levels. Learning should be interesting, fun, and meaningful and result in active and enthusiastic engagement by students in the learning process (p. 92).

One approach is to try to create an environment supportive of student learning at a distance and capitalising on the experiences and existing knowledge base students might already have. The focus then is on the student and the learning experience, not on the class as a unit nor on the instructor as expert and presenter.

## The future as it relates to education and technology

One rationale in support of technology is that technology makes it possible to do something previously unachievable or to make the lives of humans easier, more productive, and/or more enjoyable. In many ways, education shares that same distinction. We learn in order that our lives may become better. At the core of education and many technological developments is the goal of empowering the individual. It follows, then, that new educational models, especially those grounded in technology, would attempt to address this personalisation of learning through technology.

Ubiquitous networking and computing provide the means to support the anytime and anywhere notions associated with distributed learning. Students engaged in distributed learning can have access to the tools, resources, and mentors needed to support their need to know and to learn. Prior to the existence of an expansive public network (i.e. the Internet), access to distributed computing was a particularly difficult problem to overcome. Networks provide the means to efficiently disseminate resources, both human and digital, in support of individualised learning. Networks also provide the means for humans to build communities that share knowledge and expertise that are neither geographically nor temporally bound.

The power of technology in its application to learning yields more than the ability to support learning anytime and anywhere. It provides the means to create tools and environments that fosters deeper levels of understanding and attainment at higher cognitive levels. It provides the means for students to work to achieve competence rather than working for a grade. (Working to achieve competence is the same as saying that a student needs to continue to pursue learning a thing until they have an "A". The factory line model requires that we label the product and move on. A competence model requires that a student continue to work until a level of performance is achieved.) Technology-based environments and tools can provide the means for students to receive individualised support and to operate on timelines separate from other students (Musser *et al.*, 2000, p. 92).

The future of innovations in technology-supported teaching and learning is aimed at the following areas:

- facilitated asynchronous learning;
- project-based learning;
- development of learning communities;

- individualised instruction;
- the restructuring of degree programs and classrooms.

In summary, connected, mediated and “smart” technology will have an increasing presence in education. This presence will enable educators to establish learning goals including discovery, comprehension, analysis, synthesis, and collaboration, in addition to the more traditional recall and recognition objectives, as has been the past experience (Musser *et al.*, 2000).

### The new model for distributed learning

The creation of a cohesive community of student learners takes some planning and a set of guidelines to operationalise plans for those actions. It also requires a certain change in attitude for students engaged in such activities. Many students are quite accustomed to and comfortable with sitting in a classroom at an assigned time, taking notes and following a sequence of well-developed presentations and activities created ahead of time by the instructor. They may be less comfortable communicating at a distance, using new technologies to support that communication, and actually being a partner in and contributor to the instruction, in addition to being a recipient of that instruction. These same perspectives may be shared by instructors whose primary influences may have been similar. Both students and instructors are faced with the challenges and opportunities accompanying the move toward facilitated group learning in distributed environments.

Traditional instructional design often emphasises what content to transmit and what opportunities might exist for learners, but may not facilitate students to become independent learners. This new model of “guide on the side” facilitation must be capable of accommodating all types of students, from passive to active, and must help them as they develop into autonomous learners. Today’s information society requires professionals who are self-directed learners. Huge increases in recorded knowledge, both in print and in digital formats, coupled with rapid advances in information technologies, necessitate such self-sustaining learning. Previously, this type of learning occurred in isolation. New teaching and learning models

present an opportunity to learn with others and to share experiences and discoveries with those collaborators.

### Building a Web course supportive of student learning communities: the IS334 experience

#### Background

In 1998 and 1999, the University of Missouri School of Information Science and Learning Technologies offered a Web-based distributed course (IS334 – “Library Information Systems”) supported by asynchronous communications tools. The course itself has been taught by the same instructor, Dr Tom Kochtanek, for the past 20 years. For the majority of those years, the primary mode of course presentation and delivery was based on the lecture method of instruction, sometimes referred to as the sage on the stage model. In 1994, videoconferencing technology was utilised to present the course as a distance-based entity. Following this initial “distributed offering”, the instructor began prototyping the course content as a Web-based course with the first totally asynchronous experience presented in the fall semester of 1997. The course has evolved since that first semester, with the overall course design and content being refined and revised to incorporate alternative approaches to distributed education. The focus of this paper is on the two subsequent offerings of IS334, in fall 1998 and winter 1999.

#### Building the course web space

Work began on the Web-based content of IS334 Library Information Systems in the winter of 1996. Initially, the pages were coded in “raw” HTML. Later, a Web page editor (Microsoft’s FrontPage97) was employed. Version 3.2 of HTML supported frames, and the attempt was made to create two separate windows of information; one representing a navigable index of topics, the second the actual content display. These windows were originally set to be sizeable by the end-user. A total of 13 browsable categories were inserted into the left-hand side of the display, ranging from Course Information to Class List and Lessons. An attempt was made to incorporate a wide array of support and informational ideas within those categories.

The main category of content was Lessons, where ten separate chapters on library

information systems (LIS) resided. Each lesson included a home button and links for goals, instruction, and assignments relating to that particular lesson. Figure 1 is a snapshot of that segment of the Web site for the course.

The goals section of each lesson contained a bulleted list of objectives each student was expected to understand after completing the lesson and related assignments. The instruction component contained the actual content, beginning with an overview of the lesson and content written by the instructor, along with internal and external links to related materials. This material represented the foundational content of the course in library information systems.

In addition to these resources, the students, the instructor, and the graduate teaching assistant were each given an account on a proprietary Web-based communications package entitled FirstClass, available from Centrinity (formerly SoftArc) (<http://www.centrinity.com/>). FirstClass provided the technology and storage space for weekly threaded class discussions as well as project group communications, individual e-mail mail boxes and a synchronous chat application. These capabilities were used to support the asynchronous and occasionally

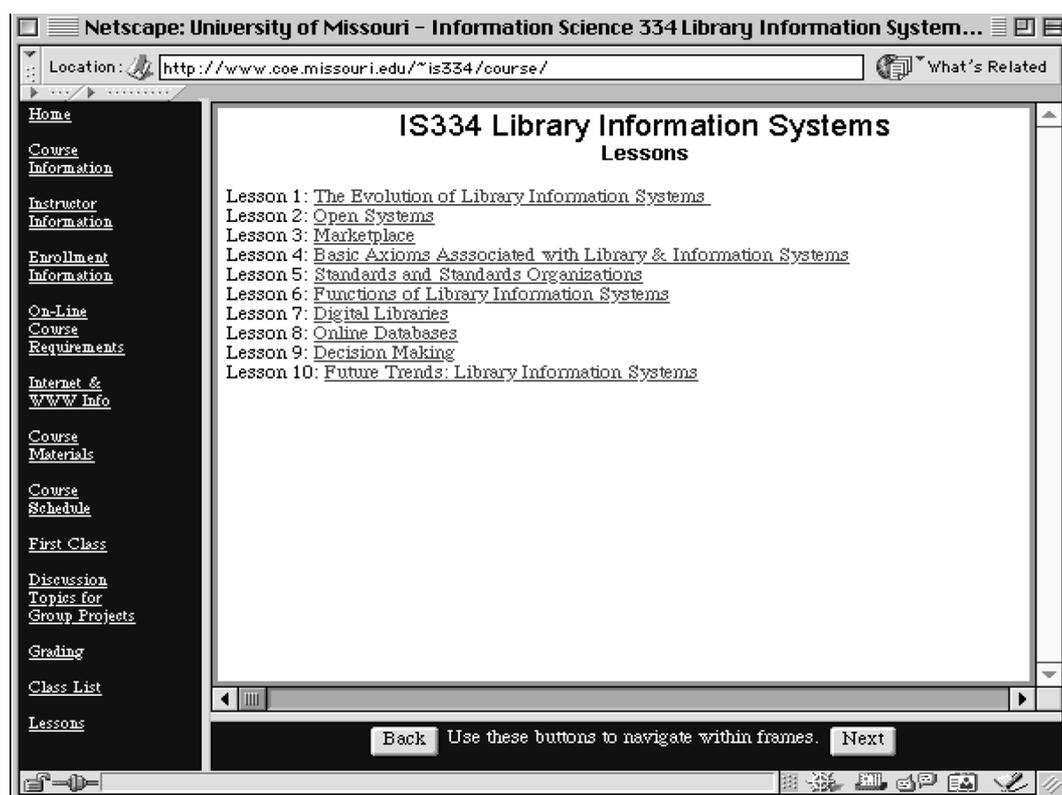
synchronous communications between students and the instructor. It was with this tool that the instructor and his TA set out to create student learning communities.

### Creating and supporting asynchronous threaded discussions

During the fall 1998 and winter 1999 semesters, Karen Hein served as the graduate teaching assistant for IS334. A total of 60 students were enrolled in the distributed course over the two semesters. Only a handful of these students were in residence, the remainder being off-campus and, in some cases, out-of-state. Communications, both synchronous and asynchronous, were supported by Web pages, e-mail and FirstClass, the proprietary communications tool utilised throughout the course.

Students were introduced to course content and interaction through asynchronous weekly threaded discussions. In these discussions, the instructor presented an initial topic through the use of questions aimed at drawing upon the students' own personal and/or professional experiences, as well as their initial reactions to the subject matter. As the discussions took off, it was soon realised these asynchronous tools provided students with an

Figure 1 IS334 Web site



environment where students were learning not only from the instructor but also from each other. The learning process was thus transferred from relying solely upon the instructor to involving those students who were willing and able to communicate their own experiences and opinions. In many cases students were able to pose questions to other student colleagues, asking the more experienced among the group for advice and guidance. Collectively, these experiences and opinions can far exceed those of a single instructor, and can create a foundation upon which student learning communities are built.

In addition to the discussions amongst class members and the instructor, guest educators were invited to participate in the learning process. Both were geographically dispersed across the country — one based in Monterey, California, and another based 150 miles from the main Columbia campus in Kansas City, Missouri. During their week-long participation, these guests were inundated with questions and comments from the students. The online environment provided students with the opportunity to interact asynchronously with former students who were working in professional positions relevant to the course content. Discussions between students and guest educators allowed students to come to a better understanding of how concepts and issues raised in the course were considered/addressed in real-life situations. These interactions were more extensive than those experienced during the traditional physical offering of the course as time constraints and availability of the guest educators had an impact upon the learning experience. See the Appendix for examples of student communications.

### **Student project groups as learning experiences**

In each of the two course offerings, students were also presented with project-based learning opportunities. During one of the weekly discussions early in the fall 1998 semester, students proposed the creation of a Web-based resource on the course topic (LIS). Between five and seven students collaborated in each of the five project groups gathered during the semester. Combined, the groups formed what is now Project LIS: [http://www.coe.missouri.edu/~is344/projects/Project\\_LIS/](http://www.coe.missouri.edu/~is344/projects/Project_LIS/)

The Appendix, Figure A1, shows a copy of the homepage for that Web site. All of the project groups were grounded in the context of

overall course learning objectives with the instructor and TA facilitating the coordination and operational considerations within and amongst the groups (Kochtanek and Hein, 2000),

Students were encouraged to think beyond semester boundaries in these project groups as the instructor and TA attempted to promote learning as a continuous process rather than as distinct events loosely bound in the context of a graduate course. To elaborate upon this idea, students in the past have tended to think of learning/courses in terms of events, such as to get grades or to pass an instructor's test — the familiar scenario of learning what the instructor says is important, studying for the test, taking the test, and then, setting aside that learning in order to focus on the necessary content for the next test. With Project LIS, students proposed the creation of the project, determined the objectives to be achieved and the manner in which to achieve them in order to create this Web-based resource. Students utilised the communication capabilities of FirstClass to facilitate the creation of the project. Within each of the groups, each member, the instructor, and the TA initially brainstormed ideas for moving towards the achievement of the self-determined goals and objectives. Through discussion and interaction, students gradually came to a consensus as to their plans of action and division of labour within the group. (Samples from the initial communications about Project LIS are included in Appendix.). Throughout the remainder of the semester, project group areas were revisited to update members on the progress of individuals. Periodically, the instructor and/or TA dropped in to each group's area to provide feedback, encouragement, and assistance as needed. These interactions and achievements assisted in the solidification of the learning community being created by class members.

In all, the instructor's role was transformed into that of a facilitator, someone who guided and supported students as they determined their own learning pace and learning objectives within not only the project group, but also in the course. The results of student decision making and actions taken to achieve those self-determined objectives were key components in building student learning communities.

The learning communities originating in the student project groups of the fall 1998 semester carried into the next semester as four

of the six student project group leaders agreed to continue their participation in the project along with a new group of students enrolled in IS334. As the winter 1999 semester's students became involved in Project LIS, the learning communities expanded to include former and current students. In this setting, the continuing group leaders gained even more insight into facilitating teams and problem-solving. Currently-enrolled students also benefited from the ability to call upon these leaders as resources, providing a measure of continuity for the project as a whole from one semester to the next. An additional unifying thread came as Hein continued in her role as overall project coordinator during the subsequent semester, though this time as one of the participants at-a-distance. Her move to continue her education at the University of North Carolina at Chapel Hill created a truly distributed learning environment.

### Barriers to success

Based on these experiences, the facilitators have noted a number of barriers that need to be addressed in the attempt to improve distributed learning environments. These include:

- newness of the concepts associated with distributed learning;
- limitations of asynchronous communications;
- time commitment for facilitators and students before, during and after the course;
- technological barriers.

Both students and instructors lack experience with the concepts and operations associated with creating and sustaining a quality distributed learning environment. It has been noted that students enrol in distributed learning courses primarily out of convenience and because of the apparent flexibility of scheduling and participation (Kochtanek and Wen, 1999). Courses are often advertised as "Web-based course offerings", referring to the mechanism of delivery rather than the model of instruction. Because of this focus, student expectations may not match those of the instructor.

In addition, the concepts associated with student-based learning, collaborative interactions, and the building and maintenance of asynchronous learning communities may be new to many students. Some students find it difficult initially to adjust to this new distributed

environment. Many of the concepts associated with distributed learning are not integrated into other courses, thus students may enter the experience unaware and/or unsure of the learning process in a distributed course. In addition, those who have had previous distributed encounters find their experience in a course based on student learning communities and project-based learning is quite different from other online courses due to the nature of the learning community itself. As communities are shared experiences, they are very dynamic, unpredictable, and very much "of the moment", meaning one cannot predict where an idea will ultimately lead the community. This can be overwhelming and somewhat disconcerting for those who seek the learning experiences found in the traditional physical lecture course.

The commitment of time associated with the development of any distributed learning course is substantial. The initial time spent creating an online course, especially if the instructor attempts to move from the "sage on the stage" model to that of a facilitator of student learning communities, can be considerable. Initial responsibilities include creating the content and establishing the learning objectives as well as the necessary preparations for online delivery (lesson Web pages, collected URLs/pointers to outside supplementary resources, and assignments). These activities can present a technological barrier for the instructor who is not necessarily familiar or comfortable with this type of development. Most instructors have experience with word processing and presentation software, but Web development tools are not part of the daily routine, at least not yet.

The requirements for communications placed on both the instructor and the students for continued interaction during the course of the learning opportunity can be quite demanding. Instructors and teaching assistants must be prepared to check into the course interactions several times each day as a particular threaded discussion unfolds. There might be a significant juncture students are having trouble passing, and if several days go by with no direction or facilitative instructor input and guidance, students stop checking in. This can cause a delay in the collective progress of the entire group. Questions posed by students can be answered to some extent by others within the group, but often students defer to the seemingly authoritative sources.

While these constitute the development and operational costs in terms of time associated with a distributed course, there is also the ongoing maintenance cost of an online distributed course. This involves the incorporation of new content, ideas for instruction, and the creation of new opportunities for students through project groups building upon previous work or arising from student-proposed ideas/discussion contributions. Figuring out how to take the best of each semester's offering and incorporating those ideas into a subsequent course takes planning and execution time. The process of encouraging students to participate in the creation and maintenance of a learning community comprising the entire class, and to assist in the creation of learning communities within the larger community via the project groups is an ongoing and consuming activity. This instructor team is constantly attempting to identify and draw out potential leaders and contributors who might ignite the spark within the remainder of the class, that they might act as exemplary collaborators for others.

From our experiences, asynchronous courses require approximately two to four times as much facilitative interaction as a more traditionally delivered lecture course. This fact often comes as a shock to administrators, who envision faculty leveraging themselves out of the classroom to initiate and conduct research in the time saved by an asynchronous course offering. This time requirement also comes as a surprise to those instructors who are not prepared for the frequent and heightened level of interaction between instructor and student. Students take advantage of the anonymity of e-mail and seemingly constant availability of the instructor in the online environment. Students have also noted the time management challenges associated with keeping up with an active class discussion and student learning community. While interaction is encouraged (communication is key to the formation of student learning communities), it takes time for all to adjust to the rigors of responding to individual messages. The physical, and to some extent the digital, environment can address those concepts all are questioning or contemplating, but often a personalised response is required to address the specific concerns or thoughts found in a student e-mail to an instructor.

Technological barriers are not new, whether the course is based on interactive technologies

or on more traditional delivery mechanisms. One major difference in creating and sustaining distributed learning communities is the simple fact that collaborators are typing, not speaking or listening as they might in a more traditional exchange of ideas and information. The keyboard has a rather limited set of communicable characters, and even when various abbreviations and symbol combinations are used (smiley faces, all caps for yelling, etc.), these expressions cannot come close to what can be accomplished in ordinary face-to-face communications. Other technological barriers include access considerations. While many students have access to more than one machine at differing locations during the time frame established for communications, that may not be the case for all students. Collaborative communications taking place in high speed environments (beyond modems) are quite distinct from those that take place across high speed networks.

Collectively, the challenges mentioned above provide an initial set of barriers that must be overcome before real progress can occur.

### **Tips on initiating successful distributed courses in building student learning communities**

One of the first steps is to make the effort to prepare students:

- to work asynchronously (the mindset);
- with technology (the tool);
- to work in groups as collaborators.

Communicating through technology with students who are at a distance takes a certain commitment on the part of all students and all facilitators. Technology can be a barrier in establishing communications among and across these groups. Over the duration of a semester, circumstances and situations may change. As both students and instructors have found, the distributed approach is a new way of thinking about teaching and learning. Some catch on quicker than others. And it can be expected that one or more technological glitches will occur. Sometimes these problems affect a single student (connectivity problems), but we have had situations where entire servers were out of commission for a period of time, creating confusion and frustration for those who are earnestly attempting to collaborate.

Prepare yourself and your colleagues with regard to content, interactions, and time commitment.

Creating Web content is quite different from the usual preparation an instructor might make for a classroom presentation. Most would argue that more time and preparation goes into a fully developed Web class than into a conventional lecture-based class. This results in a commitment of time and effort in order to ensure that the collaboration between students goes smoothly.

Build a sense of community across several classes (administrative support):

- within each class – course ownership;
- within project groups – special circumstances;
- within each student – as part of a whole.

First of all, we like to give the students a chance to define the direction of the course, specifically through the use of collaborative group projects. This can give the student base a sense of ownership of the class, and of their learning experience. One programme may offer several Web-based courses. If differing tools and distinctly unique approaches to teaching and learning are used in each of these courses, students are generally left with a feeling of disconnectedness across a curriculum. Administrative commitment to developing and supporting a stable set of tools and styles can help alleviate those feelings.

Initiate communications:

- setting student expectations for contributions;
- thoughtful and relevant starts to threaded discussions;
- bring in “distributed” (guest) lecturers.

Most instructors expect the students to visit the communications sites each and every day, if possible. Our approach is to use the beginning of each week to initiate a new topic, which we (as instructors and facilitators) seed with a set of questions, perhaps after some assigned readings are covered by the individual student. It is important that the facilitators also visit and comment on the site every day.

Occasionally, it might seem prudent to change things a bit by bringing in a distributed guest speaker just as one might have a visitor present in a classroom situation. This takes the pressure off the instructors and offers a fresh voice of authority for students to interact with.

Sustain communications:

- be prepared to spend lots of your time online (daily);
- get a great GTA to help you stay on track;
- develop students into thinking independently and contributing to the knowledge base of others;
- praise the stars, motivate everyone.

Be a guide, not a sage!:

- learn to facilitate learning, not dictate it;
- provide advice and counsel;
- be clear in your communications regarding boundaries of jurisdiction and ownership of problems.

Be prepared to be flexible:

- take off in a new direction initiated by students;
- spend an extra week on a topic they clearly become interested in (or confused by);
- encourage extra curricular activities;
- chat groups;
- after the semester is over, offer students an opportunity to continue certain aspects of what they have learned, perhaps through independent or guided studies.

## Summary and questions for further research

In reflecting upon how student learning communities were built throughout the fall 1998 and winter 1999 semesters at the University of Missouri, there are a few key points to emphasise regarding our experiences with student learning communities and the asynchronous learning environment.

The first key point is the instructor’s level of comfort in transforming his role from “sage on the stage” to facilitator. As a facilitator, the instructor can provide students with opportunities to become more involved in the learning process, in setting their own learning pace and in contributing to the refinement of the course as a whole as learning becomes more tailored to student needs.

In our experiences, student learning communities were created through interactions in student-to-student, student-to-group, student-to-instructor, and student-to-guest educator communications. These interactions provided students with the opportunity to learn from each other and to become more involved in the learning process as each shared his/her own personal/

professional experiences and opinions in the more flexible online environment.

Providing students with opportunities to participate in projects and courses that were not presented as events but as evolving experiences is an additional element.

A final point to consider is the movement away from the view of courses and projects as loosely connected events. The online asynchronous environment enhances the possibility for creating student learning communities that transcend geographic and time boundaries, thus providing for a type of connectivity not necessarily achieved in the traditional physical classroom experience.

As we reflect, we also realise there are other questions to be answered as we take advantage of the opportunities provided by distributed education and asynchronous learning environments. These questions range from

- the measurement of student success: how does one measure success in Web-based course delivery?
- outcomes and achievements: is it possible to map learner outcomes and achievements?
- learning styles: how do learning styles affect learning outcomes?
- creating environments where Web-based courses are viewed as integral components of well-rounded degree programmes rather than specialised instances.

We feel continued experiences by facilitators and students will help refine what may become a major shift in the delivery of instruction: the creation of student-centred learning communities supported by asynchronous communications tools.

## References and further reading

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## Appendix. Individual messages concerning the creation of Project LIS. Students' names have been omitted

Saturday, September 12, 1998, 10.43.14 a.m.

URLs of IOLS Item

From: [Student1]

Subject: Let's take this discussion somewhere

To: Q334

cc: Tom Kochtanek

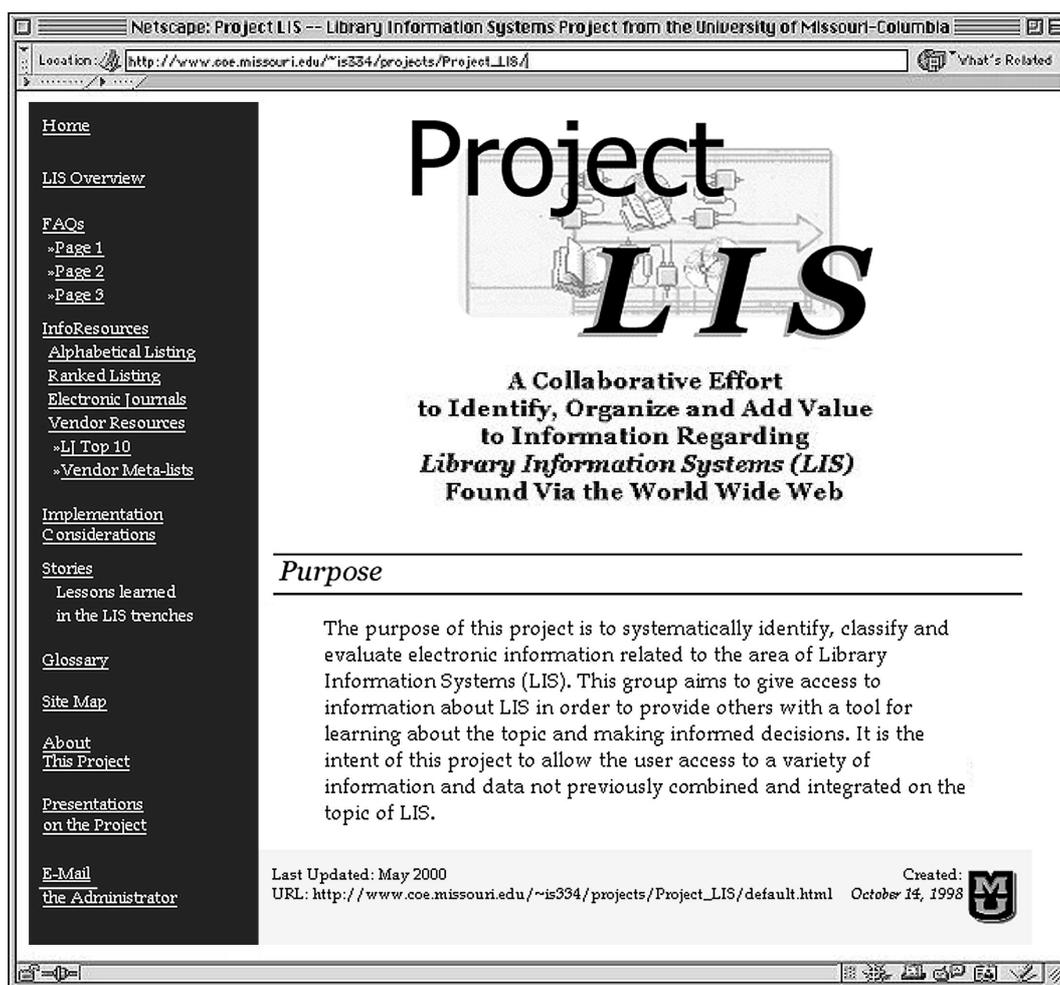
Dr K. and Q334 Class,

I have a few general comments and suggestions about what has been occurring around the compilation and discussion of Library Automation System URLs.

First, I agree with several who have commented on the overwhelming nature of reading everyone's comments and input, but there has been a lot of very good information shared and given. However, my thought at this point is perhaps we should be moving away from just sharing all this information and comments and critiques and actually doing something with it.

[Student2]'s consolidated list is a very good start and grand effort, I believe this to be something that I can use and refer to later. But it seems that the main theme of all our

Figure A1 Homepage



talk and messages is really an attempt to figure out how to find good information in electronic format about LIS. I propose therefore that as a group we perhaps focus our discussions on coming up with guidelines and maybe even a template or list of criteria, etc. (like the one created in a past class for evaluating LIS) for evaluating and deciding on “good” sites for this type of information. I’ve seen many people say that sites are good or comprehensive or helpful, but what do any of us really mean by these things? Maybe we could start to bring all this stuff together in a more comprehensive and (meaningful?) format. I would like to see us take all this information and somehow synthesise it. Any other comments or suggestions?

Thursday, September 17, 1998, 11.37.57 a.m.

From: Tom Kochtanek

Subject: Re(2): Project Group Invitation

To: [Student3], Karen Hein

cc: [Student1], [Student4], [Student5], [Student6]

Invited Project Group Members:

... Here’s my perspective on the task at hand:

Each member of the Q334 class has put forth some effort in locating and perusing the sites collectively generated by the class as a whole. You five have distinguished yourselves in the process of that discussion (that translates into extra points for effort!), and I felt it to be a natural extension to invite those who seem to be shareholders to complete the task through continued refinement.

I don’t want to position myself to tell this group what I expect, I want the team to determine what can be done to render the effort to date in a more cohesive fashion that can be easily distributed. The organisation will be more important than the delivery mechanism (the Web). That’s what this group should focus on. We can take the output of this organizational effort and code [it] in HTML with reasonable ease. Don’t worry

about the technology required; Karen and I will try to support that. On the other hand, if you want to learn how to use an editor to create Web pages easily and quickly, and you can visit campus, we can build that in as well!

Regarding the time it will take, I just don't know. It will depend on what the group takes up as its task. I think of all the effort that has been expended to date, and how close we are having something cohesive, and feel compelled to complete the project. I'm certain you all feel this way as well. Let's try to put our heads together to determine who can contribute what, how and when to communicate . . . , etc.

Hope this gets us started on the project. We can use the rest of the Q334 class as a sounding board for comments . . .

regards,  
Dr K

Friday, September 25, 1998, 5.16.20 p.m.

Project URL Item

From: [Student1]

Subject: Re: How to begin?

To: Project URL

I[n] my own mind what I have envisioned from what we all discussed is that we are working toward generating a Web-based document with information and evaluation on LIS, including links . . .

In looking at these two things (which may be oversimplified), I would say that we need to begin to organise the sites (which Student6 seems to be doing). Also, we need to decide what type of value added comments we wish to add and if we want to search for more sites, or go with the ones that we have already . . .

I would like for us to keep in mind that we want to keep the format and design of this open enough that it can be easily added to in the future and that we are making an effort not to replicate other such information about LIS, but are trying to add our little bit to what is already out there. Comments on my comments are welcome. I look forward to continuing to move forward (?) or is i[t] around in the project.

Friday, September 25, 1998, 8.20.09 p.m.

Project URL Item

From: [Student1]

To: Project URL

Hi Group,

Do you all think that that the points I brought out earlier are a feasible direction to head in? [Student 5] commented that she is still unclear as to how our contribution will be unique and different, I think we are all still trying to figure out exactly what to do . . .

Let's get input from everyone in the group and decide for sure what we want to do and then we can decide about dividing into groups, two or however many . . .

Saturday, September 26, 1998, 3.05.57 p.m.

Project URL Item

From: [Student5]

Subject: Re(5): How to begin?

To: Project URL

Sorry – somehow I sent the message instead of deleting the mistyping. Anyway, what I was suggesting was asking the class to each submit a briefly evaluated site that we can add more comments about as we check them out. Make sense? Maybe we should make a list of questions that class members can answer, such as:

1. Who is responsible for the site?
2. Is i[t] current?
3. Is it evaluatory or sale pitch information (appropriate scholarly terms of course)?
4. Is it geared for any library or to academic, school, public, or special?
5. Is i[t] a system site or smaller product site (parts of a system, single use product – like a reference package or business research package, best books list etc.?)

I better send this now before i oops again. By the way, I don't know anything about Web pages or formatting or such. This e-mail thing is still quite a challenge for me as you can see. Here it goes – I really want to send it now.

Saturday, September 26, 1998, 9.30.19 p.m.

Project URL Item

From: [Student7]

Subject: Re: How to begin?

To: Project URL

Sorry I am tardy in responding. I checked a few times for messages since I became a part of the group, and then when I didn't check, the discussion took off. First of all I really needed to catch up with what you all were thinking. After reading your input of Friday and today, I feel that the first thing we need to do is determine our purpose and content and then take one step

at a time. Let's wait to worry about the Web page and organising the site until we decide about this. I got the impression that our purpose was to provide a one stop shopping site for all of the information we all spend many hours searching. We definitely need to include an introduction stating this purpose. The critique and comment addition would be a great help, but first we need to have a set of criteria for qualities we are looking for, split up the URLs between us, and then uniformly apply them to each site.

After we see the sites that are worthy, then we can organise the content. We may find more sites as the class continues. I know that as I was looking for more information on client-server, I came across some interesting sites that might be useful. I feel that we should start simple and then elaborate or expand our content. It's better to have quality over quantity. Can we first agree upon our purpose and content as our first step?

Sunday, September 27, 1998, 11.23.53

Project URL Item

From: [Student4]

Subject: what I've done

To: Project URL

cc: [Student3], [Student7], [Student6],  
[Student5], [Student1]

Tom Kochtanek

... How about if we divided up [Student2]'s list, each of us assuming responsibility for whatever number of URLs the division makes, we then review those first hand again, adding the value added comments we find from other messages, cut/paste revise etc. and come back with a ranked organised, value added list to put back together for further review, revision by each of us and finally, ask rest of class to checkout for anything we've[e] missed. Someone needs to be willing to begin on the introduction piece, I have no experience with HTML so am worthless there, but willing to learn. Dr K seems willing to contact expert users and vendor for their input.

So, what does anyone think? Am I all wet here? ... Also this project is not on a time constraint is it? I would guess we have pretty much the rest of the semester to finish? Dr K, please comment on that, I could be all wrong about that? ...

Monday, September 28, 1998, 8.52.07 p.m.

Project URL Item

From: [Student1]

Subject: Re: what I've done

To: Project URL

Ok, as I see it. Purpose statement, goals, then let's make some group evaluation questions to be applied to all the sites. Also, as I am thinking of it, I don't necessarily think we need to ask the rest of the class for much additional work or input, I think [Student4] has done what we were going to ask for. So here is a "go" at those items mentioned above:

Purpose statement: the purpose of this project is to systematically identify, classify and evaluate electronic information related to the area of Integrated Online Library Systems (IOLS). This group aims to give access to information about IOLS in order to provide others with a tool for learning about the topic and making informed decisions. It is the intent of this project to allow the user access to a variety of information and data not previously combined and integrated on the topic of IOLS.

(I think that we need to keep this in mind for now and maybe later when the project is over we can change wording from what we want to do to what we did produce. But it helps us keep in mind what we are aiming for now.)

Please provide feedback, additions, corrections to these. Then once we have these all in order, we can start writing the evaluation questions. Or has [Student4] essentially already made up our questions, did you apply a systematic set of questions to all the sites you looked over [Student4]?, If so, we could just write those out in written form and talk about them.

The Project LIS Web site: [http://www.coe.missouri.edu/~is334/projects/Project\\_LIS](http://www.coe.missouri.edu/~is334/projects/Project_LIS)