Collaborative Learning, Distance Learning, and Knowledge Management

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Abstract

This paper seeks to share information about a distance learning Master's degree program in technical communication management at Mercer University. The paper provides a history and background of the program, including information on its evolution, approach, content, student demographics, and student responses. Also discussed is the collaborative learning method used in the program, as well as a discussion of the program's shift in focus from technical communication to knowledge management.

Overview and Background

The degree program, which was begun in 1995, was conducted primarily during its first two years as a point to point distance learning offering to technical communication professionals located in Atlanta, Georgia as well to a group of technical communicators at Arthur Andersen in Sarasota, Florida. Local Atlanta students came to the campus to participate in a traditional classroom environment, in which lectures and discussions were videotaped and disseminated to the group in Florida. The Florida group in turn met on a weekly basis, viewed the videotape, and further discussed the content at their site. Face to face meetings occurred at the beginning of each semester involving both groups, with sites for the meeting alternating between Atlanta and Sarasota. Primary interaction between the two groups during each semester occurred via phone, audio-conference phone, and email. Student research papers and deliverables were posted to a classroom web site.

During the last four years, the program has shifted fairly dramatically to that of an entirely web-based multi-point, multi-disciplinary group distance learning activity. Content has shifted from a focus on technical communication to that of knowledge management. Graduate students from a variety of disciplines are dispersed across the United States, with a few located in Europe and Japan. The typical student currently in the program is middle-aged, married with children, has management in their job title, and works for a high technology company related to computers or communications.

A successful method used to broaden the base of the types of students in the program is to offer a minor in technical communication management to Mercer's graduate students in engineering. These students are working professionals who are obtaining a Master's degree in electrical engineering, engineering management, computer engineering, or software systems engineering. Typically, they partake in traditional classroom type graduate education out of the main campus in Macon, Georgia. A student who is pursuing a Master's degree for example, in engineering management, takes three courses in technical communication management to obtain the minor.

Often, the degree minors are engineering students who have moved away from Macon due to job transfer. The best way for them to finish the degree is by participating in our distance learning program via the web.

Undergraduate majors of the current group of Master's degree students are as follows:
- 37% have degrees in business, management, information systems, and computer information systems
- 33% have degrees in English, journalism, communication and linguistics
- 15% have degrees in social science, education, and science

Current distance learning elements used in the Master's degree program are as follows:

- MSTCO (Master's in technical communication management) Campus Online
- Digital library based
- Case study based
- Electronic research paper deliverables
- Iterative development process of deliverables
- Colleague review of deliverables in process
- Self-assessment review at end of course
- Mail list for asynchronous messages between and among instructor and students
- Text chat for "live meetings" in which students discuss electronic readings and projects
- Team learning and collaborative learning

The program is divided into four modules, each of which is comprised of two courses:

- Module 1. Advanced Technology
  - Multimedia
  - Hypermedia
- Module 2. Business Issues/ Practices
  - Electronic Work Teams
  - Globalization of Electronic Communication
- Module 3. Processes
  - Usability Evaluation of Web-based information
  - Online Information of Web based education and training modules
- Module 4. Foundations
  - Learning Theories as applied to Knowledge Management
  - History and Theory of Communication

In addition, students participate in a team project research course. This course, taught by the editor of Technical Communication (journal), involves the development of electronic based aspects of the scholarly publication. Examples of projects include developing electronic manuscript submittal and review process, evaluating and re-designing the e-journal version of the publication, and developing an online discussion forum for authors.

<u>Student Reaction</u>

To obtain a better idea of MSTCO students' response to the program, here are some comments "in their own words."

Sherry Davenport, computer systems analyst and programmer, educational institution:

The MSTCO program provided three crucial advantages. 1) The MSTCO program is part of the Engineering School, which directs the program to a more technical rather than liberal arts emphasis; 2) The MSTCO distance learning program enables flexibility. I set my own study hours and did not waste precious time traveling to and from classes. My more-than-full-time job plus four children would have made the conventional course delivery prohibitive for me; 3) The MSTCO program enabled me to learn how to continue a lifetime of learning. I was encouraged to discover what was of most interest to me within the parameters of the course and then was guided enough to "discover" the world on my own through the Internet. Access to the Internet and knowing how to most efficiently use it has been a tremendous boon to my education. I am still very involved in continuous learning. My current job is to help build an online community where software developers can access the tools and the information required to create software applications.

Becky Roberts, web communications manager, consulting firm:

I have found that being a distance learner has pushed me to explore new technology and sharpen my skills to keep up to date with a rapidly changing work world. I also like being exposed to a wide variety of ideas through networking with classmates who can literally be all around the world.

Lisa Sutton, e-commerce manager, telecommunications:

The MSTCO program explored the very latest techniques for developing and disseminating information. I have updated my workplace skills immeasurably, and find that I am able to directly apply this learning on the job. I think the key is the MSTCO focus on the web as both a distance learning delivery method and as the enabler of contemporary information development. The distance learning structure allows me to fit the learning experience into my family and work life.

Yoshimi Matsunaga, technical translator of engineering information:

What I like best about the MSTCO program is that I can learn practical methods through the cases, which is very much like the real environment... What I like best about the distance learning aspect of the program is that I can continue my graduate study in Japan without worrying about borders on earth.

Method

How we make this program work is a result of the following actions:

- Make learning fun
- Trust the learners for they are mature, motivation adults
- Get learners involved in the online campus/content creation
- Don't be afraid of failure; try things out
- Use a case study approach
- Use electronic research / digital library
- Peer Assess / Self-assess
- Exercise tact and patience and show humanity
- And, most importantly, collaborate, collaborate, collaborate

Learning Theory and Practice

From a learning theory and practice perspective, we utilize the following theories, methods, and environments to make the adult learning experience in the MSTCO program successful. They include collaborative learning, cognitive coaching, enactivism, and a constructivist learning environment.

What is collaborative learning?

This is a strategy for learning that is based upon Lev Vygotsky's social development theory, which postulates that social development and interaction plays a fundamental role in the development of the individual learner's cognitive abilities, including thinking, learning, and communicating. Through the act of collaboration, learners share knowledge, pool resources, interact within the learning group to produce deliverables that are theoretically more complete and robust than that which would be created by an individual learner working on his or her own. Closely related to the theory of *enactivism*, collaborative learning also takes as a given the fact that positive changes and better learning results occur through the simple, but continuous interactions amongst the learners over a period of time. Stronger and weaker members are paired to encourage *cognitive coaching* within a *constructivist learning environment*. As distance learning becomes more widespread in which virtual learning communities will interact in a virtual learning environment, much of the collaborative learning activity will occur in cyberspace.

What is cognitive coaching?

Similar to *collaborative learning*, cognitive coaching is a type of multiple mentoring, in which the learners, become more and more aware of their own mental processing activities, through the process of guiding each other and sharing insights, information, and problem solving approaches. If the coach (instructor) is not an equal, but has greater knowledge than that of the learners, then the goal of this "expert" is to foster even greater independence in the learners by providing personal insights on the expert's own thinking processes that relate to the problem solving activity. This coach seeks to foster the further sharing of information between the learners as they go about the process of exchanging ideas and problem solving methods.

What is enactivism?

This is a thoroughly constructivist theory of cognition which attempts to explain how people obtain knowledge, interact with the environment, and with others. Enactivism is primarily a social phenomenon and is related to *collaborative learning*. A central principle of enactivism is co-emergence, which is the product of the interactions and communications that occur within a collaborative learning environment of learners, in which the stronger and weaker partners grow and help each other as they learn. As in Vygotsky's social development theory, enactivism is important to the development of human consciousness and cognition through the shared activity of learning occurring within the social relationships of the individuals participating in the process. Enactivism is also an aspect of complex systems in which enhancements to the entire system occur as a result of repeated information sharing interactions between as few as two entities over time.

What is a constructivist learning environment?

Based primarily upon the constructivist learning theories of Piaget and Bruner, a constructivist learning environment is one in which learners, either in a more traditional classroom setting, or more often currently, a virtual learning environment, build information in a team based manner that emphasizes learner knowledge sharing and collaboration. They acquire knowledge, share knowledge, and structure the knowledge amongst their teammates, with the instructor acting as a guide, co-collaborator, and coach. With the advent of the Internet, the constructivist learning environment may be part of a larger virtual campus network that includes web-based education and web-based knowledge transfer. Whether a virtual or a real classroom environment, the goal of the constructivist learning environment is to simulate a real world setting, in which the learners, utilizing their previous training and experiences, perform discovery learning activities and come up with a solution to a problem initially posed by the instructor.

Toward Knowledge Management

As the program has evolved, as more diverse types of students participate in the program, and as the nature of information dissemination changes in the Internet age, we find that there has been a move from a content perspective in the program away from technical communication and toward knowledge management.

What is Knowledge Management?

This is a new perspective on information and communication in both business and academic organizations, which focus on knowledge as dynamic, ever-changing, socially based, and shared via computer technology. The current goal of knowledge management is to capture the organization's explicit knowledge (i.e., knowledge extant in corporate memos, reports, policies, and procedures) and individuals' tacit knowledge (i.e., knowledge stored in people's head and shared amongst immediate colleagues), store it, spread it, and re-use it. A key element of knowledge management is collaboration. An important goal of educators in the digital age is to teach students how to be effective knowledge managers in this new digital environment. In the current digital age educational paradigm, knowledge management involves primarily three areas: (1) business transformation, (2) organizational learning, and (3) Web-based knowledge transfer.

Business transformation involves using technology, especially communications and collaboration technology, to enhance every aspect of how the business enterprise operates. Business transformation is different from reengineering because it is less concerned with departmental cost reductions and more concerned with spearheading enterprise-wide organizational learning, innovation, and the application of breakthrough digital age technologies to create new products and services. In the recent past, data processing primarily handled structured information to run the financial and accounting aspects of the business. With the rise of the Web and the digitization of rich data types (e.g., image, audio, video, and animation) within digital knowledge objects (e.g., white papers, design documents, policies and procedures, and technical specifications), enterprises can now shift their product focus from physical assets to knowledge assets.

Organizational learning, which is the learning that occurs amongst individuals, groups and teams within the enterprise allows for the creation of the learning organization, which is learning by the organization as a total entity or system. The creation of a learning organization is a result of a business enterprise reaching a point of metacognition, of becoming conscious of its own processes and decisions and aware of the skills of its knowledge workers. Vannevar Bush's vision of a global research-oriented digital library is closer to being a reality today with the rise of the Web as an information-sharing and distribution "collaboratorium" (Bush's term) that helps the enterprise better understand itself and transform itself. Educational institutions have the same potential to build an electronic campus infrastructure and to build their own distributed network system so that their customers -- their students -- can share information electronically with instructors and peers alike, whether they are on-campus students or distance learners. Educational institutions need to be learning organizations. They need to be more conscious of how they transfer and share knowledge and how effectively they use technology to do so.

With the rise of the digital economy and the Web, enterprises are better able to disseminate and share information within and outside of the corporation on a global scale through web-based knowledge transfer. In so doing, these organizations become more cognizant of who they are and who their customers are. In the world of electronic work teams, knowledge workers are manipulating bits more and atoms less. Knowledge managers, industry trainers and school educators are focusing more and more of their attention on the evolution of knowledge objects from analog to digital, from paper-based information to electronic information that is indexed and catalogue. Thus, an important goal in both industry and our schools is to build the digital library, the active storehouse of knowledge that comprises the electronic corporate memory in industry and the electronic campus curriculum and content in education.

Conclusion

Over a six-year period and as a result of the hard work of MSTCO instructors and students, we have built a knowledge-sharing vehicle, our electronic campus, which is a real, living, continuously evolving knowledge asset that promotes graduate student growth, collaboration, and development.

It is hoped that sharing information with you about this program, what makes it work, and what theories, methods, and environments are employed will help you as you formulate ways to

initiate collaborative learning, distance learning, and knowledge management activities within your curriculum.

Select Bibliography

Brown, John Seely, Collins, Allan, and Duguid, Paul. "Situated Cognition and the Culture of Learning." *Educational Researcher*. Volume 18 (1989) pp. 32-42.

Bruner, Jerome S. *The Process of Education*. New York: Vintage Books, 1960.

Bush, Vannevar. "As We May Think." *Atlantic Monthly*. (July, 1945), pp. 101–08.

Dillon, Patrick M. and Leonard, David C. *Multimedia and the Web from A to Z*. 2nd Edition. Phoenix, Arizona: Oryx Press, 1998.

Jonassen, David H. *Computers as Mindtools for Schools: Engaging Critical Thinking,* 2nd edition, New York: Prentice-Hall, 1990.

Knowles, Malcolm S., Holton, Elwood F., Swanson Richard A., *The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development.* 5th edition. Houston, Texas: Gulf Publishing Company, 1998.

Leonard, David C. "The Web, the Millennium, the Digital Evolution of Distance Education" in Robert A. Cole, Editor. Issues in Web-Based Pedagogy: A Critical Primer. Westport, Connecticut: Greenwood Press, 2000, pp. 23-34.

Leonard, David C. *Learning Theories from A to Z*. Phoenix, Arizona: Oryx Press, 2002. Forthcoming.

Leonard, David C. "MSTCO: Master of Science in Technical Communication Management." http://www.mercer.edu/mstco

Piaget, Jean. *Jean Piaget's Selected Writings*. 9 Volume Set that includes: Vol. I. The Child's Conception of Space, 1956; Vol. II. The Child's Construction of Quantities, 1974; Vol. III. The Origin of Intelligence in the Child, 1953; Vol. IV. The Child's Conception of Number, 1952; Vol. V. Insights and Illusions of Philosophy, 1972; Vol. VI. Language and Thought of the Child, 1959; Vol. VII. Principles of Genetic Epistemology, 1972; Vol. VIII. Mental Imagery in the Child, 1971. Vol. IX. The Child's Conception of the World, 1929. New York: Routledge Press, 1998.

Vygotsky, Lev S. *Thought and Language*. Cambridge, MA: MIT Press, 1962.

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