Learning Community Link: Enhancing Learning Using Telecommunication Technologies

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In the winter of 1825-1826 William McClure and Robert Owen led the *"Boatload of Knowledge"* down the Ohio River from Pittsburgh, Pennsylvania. to New Harmony, Indiana. The keelboat carried scientists, philosophers, artists and Pestalozzian educators to the communal town of New Harmony where their expertise would help settle a utopian community. The group believed that education, based on learning by concrete experience, must be that of real substantial knowledge, whereby students perform research alongside research scientists and even publish evidence of their research with their mentors. Where once waterways were used as the chief means of transportation and exchange of information, now information flows electronically using telecommunication technologies.

In April of 1996 the **Learning Community Link** brought together teachers from four river cities in Ohio (Athens, Coal Grove, Columbus and Ironton) to plan a new journey on electronic rivers of telecommunications.

With rivers as the unifying theme for students' projects, these teachers developed activities around real-world explorations that rely upon the understanding and application of numerous concepts from a multi-disciplinary perspective. These projects went beyond traditional water-quality projects, to include the historical, social and economic roles of the rivers in the growth and development of Ohio. Students shared research data using telecommunication technologies such as the Internet/e-mail, desktop videoconferencing and full-motion interactive television. Linking teams of student and teacher researchers replicated the vision of the 19th century "Boatload of Knowledge" group.

Establishing the Telecommunity: Goal 1
The first goal of the Learning Community Link project was to establish a telecommunity. The constituencies include an urban school district (Columbus Public Schools, Columbus, Ohio), three rural school districts in southeastern Ohio (Athens City School District, Athens; Dawson-Bryant Local School District, Coal Grove; and Ironton City School District, Ironton),

a major research institution in southeastern Ohio (Ohio University, Athens) and several community resources (the Center of Science and Industry (COSI), the Columbus Zoo and the Ohio Historical Society, all in Columbus). Three levels of technology were used to create the telecommunity: broadband, fiber-based audio/video connections; desktop videoconferencing connections; and computer-based Internet/e-mail connections.

The project originated from the merger of the Appalachian Distance Learning Project (ADLP) and the Columbus Education Satellite Network (CESN) to create a telecommunity that covers a large geographic area of Ohio that is also culturally and economically diverse. Connecting and updating the two existing projects provided five broadband, fiber-based video sites (3 elementary schools, 1 high school and Ohio University's College of Education). Two high schools were added to the system in July, 1997. Two other high schools are expected to be added during the 1997-98 school year. Using the broadband system, four sites can simultaneously interact.

Within the four participating districts, 21 schools (5 high schools, 5 junior high/middle schools, and 11 elementary schools), Ohio University's College of Education, the Center of Science and Industry, the Columbus Zoo and the Ohio Historical Society each received one desktop videoconferencing unit. Using the desktop videoconferencing system, point-to-point connections can be made to share voice, video and data.

The lowest level of technology used to build the telecommunity is Internet/e-mail. The 83 teachers participating in the project each received a laptop computer with Internet/e-mail capabilities. Teachers and their students can use the computer connections to interact with other students, teachers, university and community resource personnel individually via e-mail correspondence or collectively using a listserv system.

The Learning Community Link telecommunity, using multiple technologies, expanded typical school boundaries and increased communication possibilities for teachers and students. In addition to providing access to resources typically not available in remote regions of the state, the telecommunity has provided professional development opportunities for teachers and preservice college students, team-teaching opportunities, and shared learning experiences for students.

Establishing the Telecommunity: Goal 2

The second goal of the Learning Community Link was for cross-district teacher teams to develop thematic, multidisciplinary, problem-based projects where students used the technology to interact with students in other schools. Working on a common problem, students shared research data with research partners in other districts. Many of the students created and maintained a Web home page. The Learning Community Link home page address is: **www.seorf.ohiou.edu/~xx046**

Six projects were developed during the summer of 1996 and implemented in the 1996-97 school year. These projects were further refined during the summer of 1997, and will be implemented again in the 1997-98 school year. The intent of the Learning Community Link project is to develop a model that can be replicated and disseminated around the state and nation using the World Wide Web and CD-ROM technology.

Establishing the Telecommunity: Governance

The Learning Community Link is governed by a Collaborative Planning Committee (CPC).

The CPC consists of the project co-directors, project coordinators, one representative teacher and administrator from each district, the project evaluator, Ohio University representatives, representatives from community resources (COSI, Columbus Zoo and Ohio Historical Society), representatives from participating phone companies (Ameritech and GTE) and representatives from the Ohio Schoolnet office.

The CPC oversees the collaborative activities during planning, implementation and evaluation of the project. Project staff meets monthly to examine program effectiveness and clarify procedures. Internet/e-mail is used to provide ongoing communications among project staff and the CPC. During the first year of the project, a quarterly newsletter was mailed to participating teachers, administrators and CPC members provding them with updates of technology installation and program implementation.

Implementing the Project: Spring, 1996

The Learning Community Link began in the spring of 1996 with principals from each of the 21 participating schools selecting a team leader who had expertise in using technology and sincere interest in project development. Team leaders met in Columbus for two Friday night/Saturday all-day workshops in April and May, 1996. Principals also participated in the first weekend session. Emphasis of these workshops was on team building, project development and concept identification. Team leaders discussed the development and the design of a two-week summer institute. Team leaders also worked with principals to select three additional teachers to complete their school team. Some teams consisted of only three teachers and some consisted of five teachers.

Implementing the Project: Summer, 1996

Between July 22 and August 2, 1996, 83 teachers, from 21 schools participating in the Learning Community Link project attended 75 hours of professional development on the campus of Ohio University in Athens. Each participating teacher received a laptop computer with Internet/e-mail capability and appropriate software (for example, Microsoft Works and PowerPoint). An additional 25 hours of professional development was conducted during the 1996-97 school year and another 25 hours occurred during the summer of 1997.

These professional development activities were designed to provide teachers with both the pedagogical and technological skills needed for participation in the Learning Community Link. By the end of the two-week session, teacher teams completed plans for two projects: an inter-district student project and a building-level action research project.

During the first two days of the summer 96 institute, participants were surveyed as to their comfort level with different types of technology and their attitude toward the effectiveness of technology in the classroom. Survey results indicated 43.4% of the teachers responding were not sure how easy computers were to use; however, 78.3% believed that everyone should know how to use a computer.

Teachers were uncertain as to how they could use technology in their classroom: data bases (44.6% expressed no idea), presentation software (44.6% expressed no idea), and desktop videoconferencing (43.4% expressed no idea).

Participants did, however, recognize the value of e-mail (65.1%) and the Internet (67.4%). Teachers were cautious about their ability to integrate technology in their classroom (55.4% felt comfortable in their abilities). However, 80.3% believed that using technology was

effective in enhancing learning, and 74.7% felt the use of technology would be a positive experience for students. Significant to the success of this project was teachers' belief that their principal supported the use of technology in the classroom (86.3%).

During the first few days of the summer session, the school teams selected partner schools. Each "team of teams" worked together to plan one student project. The formation requirement for each "team of teams" included inclusion of at least three schools and at least two districts. Six "team of teams" were formed: one high school group, one junior high school group, and four elementary school groups. Teachers attended various sessions throughout the two weeks that were specifically designed to help the teams design the student projects and the action research projects. Teacher teams learned to map concept relationships involving multiple subject areas and to create an integrated curriculum for the student project. Other topics included constructivism and alternate assessment.

To develop familiarity with community resources that might be used in student projects, teams participated in on-site field trips to the Center of Science and Industry (COSI), the Columbus Zoo, the Ohio Historical Society and Southern Ohio Coal. A guest speaker from the Department of Natural Resources also added to teachers' knowledge of community resources.

Training on using technology and integrating technology into the teaching/learning process was also included in the summer session. Sessions were provided by staff from the Eisenhower National Clearinghouse for Mathematics and Science who assisted teachers in identifying specific resources for their projects. Presentations were also given on how to use the software purchased for the projects: Microsoft Works (word processing, data base and spreadsheet) and Microsoft PowerPoint (presentations). Demonstrations were also provided on effective use of desktop videoconferencing and the fiber-based video equipment. Additionally, action research was discussed. Building-level teams developed action research plans that were implemented during the 1996-97 school year. A team's action research problem was related to the "team of teams" student project but was customized to meet the needs of each individual team.

Implementing the Project: School Year, 1996-97

During the 1996-97 school year, six student project plans and 21 action research plans were implemented within the limitation of installed technology. A brief description of one of each type of project follows:

Sample Student Project from an Elementary School Team

One of the elementary "team of teams" consisted of Chauncey Elementary School (in Chauncey), Dawson-Bryant Elementary School (in Coal Grove) and Whitwell Elementary School (in Ironton). Their student project was designed to determine the relationship between modes of transportation and the development of their regions' river communities. Performance objectives included having students identify modes of transportation used in local communities in the past and present, as well as predicting modes of transportation for the future. Students compared goods transported on the river in the past and present and analyzed early communities that formed along local rivers and tributaries. Finally students had to demonstrate knowledge of rivers as a communication system in the past and technology as a communication system today.

To accomplish this, the student teams from Chauncey, Dawson-Bryant and Whitwell used e-mail, data bases, spreadsheets and multimedia presentation software to gather, report, analyze and share information. For example, a kindergarten class at Chauncey observed how many and what kinds of vehicles drove past their classroom window during a set period of time. That information was entered into a spreadsheet and both a table and graph were printed. The students discussed the information they collected and shared it with students in Coal Grove and Ironton. E-mail and the U.S. Postal Service were both used to maintain communication and collaboration among the student groups. [Note: plans included use of the desktop video units but these were not installed during the 1996-97 school year.]

Sample Action Research Project
The Plains Elementary School (in The Plains) identified the following action research question:

- "Will standardized writing scores improve for at-risk students by using a computer word processing program to create a body of writing related to the Learning Community Link rivers project?"

This action research plan dealt with at-risk students that are language delayed, specifically in their writing ability. The team tested their hypothesis, which was that by providing at-risk students with word processing experiences, their interest in writing and technology would increase their self-esteem. The Learning Link team used the district's own standardized writing test format to pre- and post-test the at-risk students involved in the research. However, because of delays in software delivery, this project will be replicated during the 1997-98 school year, and analyzed, before research findings are released.

During the 1996-97 school year, teachers participated in an additional 25 hours of professional development. Due to delay in equipment installations, most of these sessions were held locally. Attempts were made to meet the needs expressed by teachers. Sessions most frequently requested were those that addressed technological skills.

Although the Learning Community Link system was not yet operational, three sessions were conducted using a two-way interactive audio/video teleconferencing system "borrowed" from another state agency. In spring, 1997, a temporary connection was made between Dawson-Bryant Elementary School (Coal Grove) and Fort Hayes High School (Columbus) to enable elementary students in Coal Grove to interact with a representative from the Center of Science and Industry in Columbus. During the 96 fall and 97 spring quarters, 1997 student teachers were placed in two third-grade classrooms (Dawson-Bryant Elementary and Whitwell Elementary) equipped with broadband, fiber-based interactive audio/videoconferencing.

These preservice college students were given experience in planning and implementing science, mathematics and social studies lessons using the interactive conferencing system. Additionally, at the end of the spring quarter, 1997 preservice college students doing field work in their science and mathematics methods courses conducted a one-week science/mathematics camp for area elementary students using the broadband, fiber-based interactive audio/videoconferencing at Dawson-Bryant Elementary and Whitwell Elementary Schools.

Implementing the Project:
Summer, 1997 and School Year, 1997-98

This past August (1997) teachers participated in yet another 25 hours of professional development for the project. The focus of these sessions was refinement of the action research and student project plans developed and implemented in 1996-97. Additional emphasis was placed on students using technology to interact with other students who are not at the same physical site. Refined plans will be compiled and shared via the World Wide Web and CD-ROM some time during the 1997-98 school year.

Evaluating the Project

The Learning Community Link staff worked with a doctoral student at Ohio University to conduct a case study of six randomly selected participating schools. Teacher logs of technology use were collected and analyzed; teachers and students were surveyed and interviewed; and classrooms were observed. The emphasis of the case study is to determine how often, and in what ways, teachers use telecommunication technologies. That study's data is currently being analyzed.

In August of this year, teachers were again asked to complete the same survey that was administered in the summer of 1996. The 97 data will be compared to the 96 data to determine changes in teachers' comfort level in working with technology and changes in their attitude toward using technology in the teaching/learning process. A monograph containing the plans and results of the teacher action research plans will be compiled and published during the 1997-98 school year. Further, the student project plans and action research plans will be available on the Web and on CD-ROM. Because equipment was installed much slower than anticipated, both the action research projects and the student projects will be repeated during the 1997-98 school year. Additional data will be collected to determine the project's effectiveness once all equipment is in place.

Conclusion

Telecommunication technologies (computers with Internet/e-mail capabilities, desktop videoconferencing units, and fiber-based video links) provided by the Learning Community Link did indeed expand typical school boundaries and did increase communication possibilities for teachers and students. Using the power of computers to communicate, analyze and evaluate data and prepare presentations, students were able to solve real-world problems.

Student learning went beyond the textbook and school walls to access information located on the Internet and at other locations. Videoconferencing allowed students to interact with other students in real time to discuss research findings and also provided teachers with direct access to consultants and specialists. Teachers cooperated in developing interactive multidisciplinary projects and sharing resources and expertise via e-mail and videoconferencing. Students, teachers and support staff participating in the Learning Community Link have thus formed a true "community of learning" by using telecommunication technologies to enhance communication, enrichment opportunities and staff development. As the installation of equipment progresses, the Learning Community Link's "Boatload of Knowledge" continues its journey through the electronic rivers of telecommunications.

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