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Two developments are critical to the expansion of the use of innovative technologies in Louisiana schools: the use of networks such as the Internet and the increased use of multimedia technologies, especially CD-Roms. This article provides examples of how each of these developments are leading to changes in Louisiana schools.

Innovative Technology in Louisiana

Network Development and Implementation

Louisiana is at a pivotal junction with regard to integrating networking capabilities into the school systems. The state of Louisiana has supported four major programs, using NSF and other federal funds: the Louisiana Systematic Initiatives Program (LaSIP) to reform mathematics and science education; the Teacher Preparation Collaborative; the Curricula Frameworks Development Project; and the Louisiana Networking Infrastructure in Education Project (LaNIE). The statewide support is evidence of long-term commitment that institutions, agencies, and individuals within the state have made toward the reform of mathematics and science education.

In addition to these four state supported programs, a $564,000 grant from the National Science Foundation (NSF) was awarded to LaSIP, in conjunction with the Louisiana Department of Education (LDE) and Northeast Louisiana University and LaNIE. The project funded by the grant in October 1994 combined its efforts with the Louisiana GOALS 2000 Project and is now called GOALS 2000/ LaNIE. The project will be coordinated with other technology efforts in Louisiana, especially those being pursued by the Louisiana Goals 2000, the Board of Elementary and Secondary Education (BESE), the Board of Regents (BoR), and Louisiana Public Broadcasting (LPB) and other LaSIP programs which are supported with other funds received, including ten million dollars from NSF, three million dollars from Eisenhower Funds, five million dollars from BESE and five million dollars from the BoR. The purpose of the most recent NSF grant is to (1) develop a state educational technology plan; and (2) implement three pilot sites to integrate Internet resources into K-12 instruction. Both of these objectives are part of the overall mission of LaSIP to reform mathematics and science education in Louisiana in a systematic fashion.

The GOALS 2000/LaNIE Project

Previous research has identified three elements as critical to the successful integration of the use of the Internet into K-12 curriculum: (1) professional development, (2) assistance with curricular integration, and (3) technical support. The GOALS 2000/LaNIE project is designed to ensure the incorporation of these three elements into the process of integrating the use of the Internet in the K-12 curriculum in Louisiana. Five pilot sites for the project have been selected. Three of them have been allocated $50,000 for hardware, software, and connection costs. Two sites which were already connected to the Internet and other networks and which were already using Internet in K-12 instruction were allocated $15,000 each. These five sites represent urban, suburban, and rural locations. Two of the sites consist of primarily under-served populations.

Professional development will be provided for the 24 participants at each of the five sites that include elementary, middle and high schools. The group contains 15 teachers, 3 counselors, 3 librarians, and 3 instructional administrators. Each participant will take a three credit university graduate course "Integrating Internet Resources into Standards-Based K-12 Instruction" and also take part in three days of in-service training during the spring semester. Each will receive a $300 stipend.

Another component of the GOALS 200/LaNIE project is the development of mathematics and science curricular units that integrate Internet resources into K-12 instruction to develop students' critical thinking skills and problem solving abilities. A study published by Pogrow in 1993 found very few exemplary materials in existing comprehensive math and science curricular materials and "no comprehensive social studies or language arts curricular materials met our criteria." This finding led the GOALS 2000/LaNIE project to bring together during the fall semester of 1994 selected teachers from across the state to develop a curriculum guide with lessons. The resulting guides emphasized problem solving skills and creative thinking as goals of the elementary school program. The lessons provide many opportunities for children to practice these skills using exemplary materials to support their growth in critical thinking and problem solving.

These lessons are currently being field-tested by the participants in the project. In the field tests, teachers and their students use the Internet to access information to help them solve problems and develop an understanding of current and relevant issues.

An example of a sample lesson that uses the Internet is "Regional Data on Current Earthquakes," a lesson developed by Juanita Guerin, an eighth grade teacher in the Edgar Martin Middle School in Lafayette Parish. Guerin uses a variety of cooperative learning activities and the Internet at stations in the classroom. At one station, the students have to provide the longitude, latitude, and Richter scale readings for an earthquake. Guerin reports: "Before we had access to the Internet, we had to get these data from a textbook, and it was not a recent earthquake. Now the students access Internet and get the latest earthquake information. Last year a morning class came up with certain readings and the afternoon class came back with different information since the Internet had updated information. As a result, the students are getting real time data instead of what is in a textbook which is not current."

Students in the classrooms of the pilot teachers will be assessed on (1) their use of Internet resources, such as Gopher, Mosaic, etc., and (2) their ability to apply these resources to understand mathematics and science.

The GOALS 200/LaNIE project is also providing technical support as required to the five pilot project sites.

Anticipated Developments From GOALS 2000/LaNIE Projects

We can anticipate some of the developments that will occur after the schools in Louisiana are linked to and using the Internet by examining what has already happened in one middle school in Louisiana where the use of telecomputing, and especially the use of the Internet and CNN News, is commonplace.

The Edgar Martin Middle School in Lafayette Parish is a pilot project of GOALS 2000/LaNIE. It was represented in the summer curriculum development efforts as was noted earlier. The school is networked with ISDN connections and a media retrieval system which makes Internet and cable television available throughout the building. The use of the Internet and other information networks began in the fall of 1992 as a Lafayette Parish School District pilot project called the Network for Educational Advancement Through Technology (NEATT). It was initiated by a middle school teacher, Melinda Leger, and is an example of a successful collaboration between business, community and school organizations. This school is highlighted in the CD-ROM titled "Innovative Technology in Louisiana Schools."

At this middle school, the library is the hub of activity relating to multimedia technology and telecommunications. The librarian says "The library has become a much busier place and the students are really excited about the on-line catalog. They have the ability to access the card catalog from their classrooms. Students also have available CD-Roms, encyclopedias, and atlases. There are sixteen Power Macs in the library and the teachers can bring their students to use Internet sources for research. The excitement is unbelievable and it has not diminished circulation in print media."

When asked if she had seen any differences in student behavior or learning over the past two years since introducing telecommunications into the curriculum, the principal stated: "We're seeing a lot of student engagement. Our goal here is to teach students how to access this information and we're getting away from the traditional text-book. We're teaching students not only how to find information but also how to analyze it. For example, a social studies teacher takes CNN news from the media retrieval system and selects parts related to world history and uses the text book as a resource book, not as a basal text. Then as current events happen throughout the world, she refers back to the text. She fills in the gaps with her curriculum guide. The enthusiasm and the knowledge that the students gain from the current events perspective is phenomenal. The teachers have received a lot of feedback from the parents saying that they have wonderful dinner conversations now, and that the students can communicate now. . . ."

In an eighth grade science class, students studying astronomy use a laserdisc *Windows on Science* and access NASA's Space Link program via the Internet. The class also use an atlas and encyclopedia on CD-Rom. During a recent visit to the school, some students were taking a trip to the comet; others were back in mission control. They then engaged in lengthy discussions of what they found on their travels.

It is anticipated that use of the Internet will empower teachers to modify the curriculum and instruction in Louisiana to a significant degree as implementation of the project expands beyond the pilot stage, especially in K-12 schools. The LaSIP Project Director has stated that "current reform movements, led by mathematics and science, but with clear implications for the other disciplines, provide a singular opportunity to narrow the historic gap between national expectations and the unacceptably low performance for many students in Louisiana." Providing Internet access,

as well as training on curricular integration and technical support and the development of a statewide technology plan is providing the impetus for Louisiana to provide access to telecommunications throughout the K-12 curriculum for all students. A similar initiative is currently underway at the post-secondary level, called the Louisiana Consortium for Higher Education Networking (LACHEN). At the University of Southwestern Louisiana, faculty are implementing new strategies for research, teaching, and communications using the Internet. New college- and university-based home pages on the World Wide Web are appearing with increasing frequency throughout the state. Currently five departments at USL have their own home pages.

MultiMedia

A second significant development in moving Louisiana into the use of innovative technologies to improve education is the growth in interest in multimedia in the state. This is occurring at the K-12 level, in post-secondary institutions, and in business and industry.

One example is the establishment and growth of the Louisiana Multimedia Consortium. The Consortium is composed of representatives from business and industry, the post-secondary community, and K-12 schools and school districts. For over three years the Consortium has sponsored training, has disseminated information on multimedia development trends and applications, and has provided technical support to its participants.

The Edgar Martin Middle School cited earlier as an example of the use of networking could also be cited here as an example of the use of multimedia technologies in the classroom. Andrey Barashkov, a Russian educator who for ten months in 1993-94 was a visiting scholar with the Educational Technology Review Center (ETRC) of the University of Southwestern Louisiana (USL) and worked on designing multimedia programs for educators. He observed, "With multimedia you are in your own universe, your own world, with your own rules. You get to create what did not exist before and can bring to life something that is born in your mind. Kids like toys, cartoons, and colorful pictures. That is why multimedia attracts them. With multimedia, even fifth and sixth graders can develop their own software. And in this way, playing leads to a discovery of their own creativity. Learning coupled with fun is always interesting."

Sissy Grapes, a counselor for the Lafayette Parish School Board, echoes these comments. She reports multimedia allows teachers to teach students in a way that students are comfortable with learning. Technology allows students to push the limits and see how far they can go with information and it also ends teaching being a sage on stage.

A major development in the field of multimedia at the post-secondary level occurred in April, 1994 when the ETRC established the first university CD-Rom press in the south. The CD-Rom press makes it possible for faculty and students to design multimedia programs and publish and distribute them on CD-Roms for use by educators in classrooms. Two educational CD-Roms have been designed, created, and produced so far. A third is currently under development.

The first of these CD-Roms is titled *Innovative Technology in Louisiana Schools*. This CD utilizes multimedia to convey the scope of education technology programs in Louisiana's K-12 schools. It was designed to be a guide to educators who want to integrate new technologies into their classrooms. The disc serves as an

overview of educational technology in the state and allows viewers to watch and listen to educators from around Louisiana who are using technology to help them teach. It also includes the music of Les Frères Michot, a Cajun band from Lafayette, Louisiana.

The second CD-Rom published by the ETRC CD Press is *Notre Héritage Louisianais*. Its purpose is to provide educational materials on Louisiana's French heritage that can be used in the elementary French Immersion classrooms. Educational materials on Louisiana culture for use by elementary and secondary educators are scarce in any format, so this project fills a tremendous curricular void and an expressed need, at the same time offering materials in a state-of-the-art interactive multimedia technology. Project activities target elementary French Immersion students, but have application for the entire school population in Louisiana and may serve as a national model for multimedia presentation of multi-culturalism. The CD- Rom was funded by grants from the Louisiana Division of Arts to the Acadiana Arts Council.

The CD is the second element in a larger collaborative project called "Project Evangeline: A Study in Cajun Culture." The first was a pilot folklife-in-the-classroom residency project which resulted in the production of "Le Tissage Traditionnel." The content of the CD-Rom consists of two parts:

1. A series of interactive lessons on aspects of Louisiana French folklife, such as food, ritual, performance, trade, and domestic crafts, using a combination of video, photographic, audio, textual and illustrative cues, and
2. A "shell" program offering contextual background for the lesson content, educational models, teacher training materials in the multimedia-disciplinary use of folklife materials, evaluation tools, general suggestions for use.

One example of the material in the CD-Rom is a section on Cajun cotton weaving. Color pictures, sounds, and motion pictures contribute to an understanding of this traditional Cajun practice. An interview with one of the oldest living practitioners of brown cotton weaving in Louisiana is the highlight of this section. Users are provided with additional information (still and motion pictures, and commentary in French and English) when they click on terms such as l'étier, le rouet, and la broche.

This CD-Rom is being distributed to schools in Louisiana at no cost to the schools with funds provided by the Council for the development of French in Louisiana.

The third CD-Rom developed by the ETRC is called *STEPS* or *System Toward English Proficiency Success: A Passport to Learning*. This disc gives the user an overview of the English as a Second Language Program in the Lafayette Parish public school system.

Louisiana is moving forward in implementing new innovative technologies in education. Networks and multimedia are the first thrusts in that effort. As these efforts take root we can expect even more widespread use of innovative technologies in Louisiana schools. For more recent information on what is going on in the area of innovative technology in Louisiana schools and universities, visit the home page of the USL Educational Technology Review Center at http://www.cacs.usl.edu/Departments/ETRC.

Suggested Reading

Pogrow, S. "Where's the beef? Looking for Exemplary Materials." *Educational Leadership*, 50(8), 39-45, May, 1993.

Whelan, C.S., Barashkov, A., and Hamburg, C., *Innovative Technology in Louisiana Schools*. CD-Rom published by the Educational Technology Review Center, University of Southwestern Louisiana, 1994.

Whelan, C.S., Lantz, S. and Zink, F. "Telecommunications Across the Curriculum in a Louisiana Middle School." *Louisiana Educational Technology Review* 3, (3), 1994.

Jane Vidrine, *Notre Héritage Louisianais*. A Collaborative Interdisciplinary CD-Rom Project. Educational Technical Review Center, University of Southwestern Louisiana, 1994.

NOTE: Copies of these CD-Roms can be obtained from Dr. Whelan.