EXEMPLARY PROGRAM

Challenge 2000 Multimedia Project

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Program Description

The Challenge 2000 Multimedia Project, created in 1995 and designed for students in grades K-12, establishes a learning community in which students use appropriate technology and acquire skills needed for the high-tech workplace—content knowledge, problem-solving acumen, communication and collaboration skills, as well as self-assessment. On-site mentor-teachers support the design of classroom experiences in which students analyze and propose solutions for real-world problems by planning and producing interdisciplinary, multimedia projects. Students then present the final projects to the community at a multimedia fair.

Support for teachers involves four components: (a) teaching and professional development intended to transform practice by helping teachers become effective designers and implementers of student-centered, technology-supported, project-based learning using multimedia; (b) computers in the classrooms (rather than a separate computer lab) for all teachers and students; (c) classroom connections to the "information superhighway"; and (d) effective, engaging software and online learning resources as an integral part of school curriculum.

Student multimedia projects might be a hypermedia stack, computer presentation, Web site, or video. Classes have studied such topics as the rain forest, water pollution, designing a research facility and living quarters for scientists in Antarctica, the physics of amusement park rides, and colonizing Mars.

Quality and Educational Significance

Learning

Students develop in-depth understanding and competence in at least one content discipline. They also develop habits of lifelong learning (e.g., ability to collaborate, direct one's own learning, solve problems, communicate clearly, and think flexibly and critically).

For example, at one school, 12th-grade physics students are paired and work to develop videos combining footage of amusement park rides and their associated forces and acceleration changes. The goal is to teach middle school and 9th-grade students the physics of the rides. The teacher observes that preparing a presentation for a younger audience really pushes the students to a

Program Costs

For cost information, please contact program designee.

deeper level of understanding than would "spouting back calculus formulas." Videos are judged on correct science content, the suitability of the material for the intended audience, and the effective use of multimedia to explore the planned content (incorporation of video, pictures, and data).

The school holds an annual "Physics Day" when students collect data and images with video and digital cameras at the local amusement park. Students plan accordingly, working out what data they want to collect, how they will collect it, and how to share equipment. Sometimes they also share materials and calculations. To capture force in two of the three possible planes, each student pair is given two accelerometers and a graphing calculator with special software, which they program to collect the data they want before going on the rides.

Back in the classroom, students upload their data and print out a graph of the data points. They can thus see patterns of acceleration associated with, for example, the spin of a car. One group of students chose to explain how roller coaster loops keep people in their seats, showing how the tear-shaped loops at the park worked and what would happen if the loops were circular. They calculated that the force of a circular loop would make people six times heavier at the bottom than the force of a tear-shaped loop, so that circular loops were impractical.

At the end of the spring semester, the videos are presented in a film festival and viewed on a full screen with high-quality amplification, accompanied by much celebration and cheering.

Excellence for All

Teachers report that where the implementation of project-based learning using multimedia has been greatest, there have been significant increases in teacher expectations of student work. Further, they report that low-achieving students benefit most from the project-based multimedia approach, followed by academically gifted and talented students. Other groups who particularly benefit are students with ADHD, English-language learners, and special education students. When adding teams of schools, the project has sought to increase participation by adding teachers from schools with the greatest number of disadvantaged students.

Organizational Change

Challenge 2000 advances organizational change by providing effective models of change and supporting the teacher learning community as they implement project-based learning in their classrooms. It promotes the sharing of expertise by establishing partnerships focused around the imple-

Usefulness to Others

From 1995 to 1999, Challenge 2000 increased its teacher cohort from 40 to 116. The project's technology requirements are affordable and realistic for most schools; the software is not proprietary and can vary according to the resources of the school. Costs per unit are high during start-up but decrease as the program expands to a greater number of students and teachers. Participants include a wide range of ethnic, racial, and socioeconomic groups.

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mentation of student-centered projects in classrooms. The partnerships are composed of a more experienced mentor teacher, who has previously implemented multimedia projects, and one to three teachers new to the project-based multimedia approach. Based on their ideas for projects, the partnerships have developed proposals to secure hardware, software, and network tools needed to implement their projects. During implementation, teachers often discuss their projects within their school and have the opportunity to meet with teachers from other schools who have formed their own partnerships at program-wide meetings throughout the year. Their work culminates each year in a presentation of their students' work at a Multimedia Fair, to which parents and community members are invited to witness the accomplishments of the teachers and their students.

Evidence of Effectiveness

Teacher reports of classroom practice and observations conducted in Multimedia Project classrooms and comparison classrooms show the impact of the program on teaching. Most teachers report implementing multiple projects with their students, and the more experience teachers have with Challenge 2000, the more likely they are to engage students in sustained inquiry—asking questions, investigating them, and making predictions about phenomena. Students in these classrooms were more likely than those in comparison classrooms to be engaged in long-term projects and to work collaboratively with their peers. They were also more likely to be engaged in cognitive activities of design—interpreting and analyzing information, deciding on the structure of a presentation, revising a presentation, and thinking about how their audience learns.

In addition, the project conducted a performance assessment designed to measure students' skill in constructing a presentation aimed at a particular audience, using content provided to them. Students from Multimedia Project classrooms outperformed comparison classrooms in all three areas scored by researchers and teachers who analyzed the student products: content, attention to audience, and design.