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Mathematics and Technology Happen (M.A.T.H.) Today

The Idea

While finding effective ways to enhance the academics in career and technical education (CTE) programs may be challenging, it is essential now that the Carl D. Perkins Career and Technical Education Act and the Elementary and Secondary Education Act (ESEA) are more closely aligned.

Over a three-year period, researchers from the University of Georgia and the Georgia Department of Education partnered to track the effectiveness of a computer-based mathematics program that was used with students from special populations.

Impact

During a summer Improving Teacher Quality Grant workshop funded by ESEA, teams of mathematics teachers and CTE special populations teachers were instructed in a technology-based mathematics program. Although there was no statistically significant difference on mean beginning level of regular education, special education, and at-risk students, results showed that upper-class special education males and ninth-grade at-risk females had the largest increase in mean ending level within the program.

Anecdotal reports from teachers revealed that students with limited English proficiency also benefited from the use of a computer-based program when learning work-related mathematics. This study supports literature which reports that special populations students respond well to nontraditional methods of instruction.

Programs that involve the use of computer technology can be particularly beneficial for students who are at-risk of school failure. Students who are academically challenged frequently need more time and instruction because they do not make direct conceptual links between concrete and tangible mathematical concepts. Students who grasp the concepts quickly are often bored and unchallenged by repetitive review of material. For any student, a critical step in making the connections is that procedural knowledge be taught within the same context where it will be utilized in the future, such as the workplace. Locating and integrating a computer-based mathematics program into CTE programs can offer short-term benefits in relation to retention of course content, as well as long-term work-related employability.

Logistics

- In what career and technical educational program area did this project or activity take place?
Special Populations
- What was the topic area covered by this project?
Mathematics and Technology
- What grade level did this project address?
9–12
- How much did this project cost?
The computer-based program we used to collect data costs about \$5,000 for a three-year school license.

- **How much time is needed to prepare for this activity?**
More than 10 hours
- **How much time is needed to deliver this project?**
This was an ongoing year-long project.
- **How was the project delivered?**
Teams of teachers worked with individual students
- **Please describe any necessary professional development needed to present and use this project.**
We trained teams of teachers at a weeklong summer workshop. They implemented the program in their home schools with students.
- **How was the curriculum for this project secured?**
It was purchased from a vendor.
- **Please describe any collaboration, if any, related to this project.**
The University of Georgia collaborated with Georgia Department of Education and developers of the computer-based program.
- **What national, state or local standards were addressed by this project?**
This project worked to address the Georgia Performance Standards for Mathematics and the National Council of Teachers of Mathematics standards.
- **Was this project linked to improving technical skills?**
Yes, it was. The project focused on combining the work and real-life applications of mathematics.
- **Was this project linked to improving academic skills?**
Yes, it was. Mathematics concepts were applied to work settings within the computer-based program.
- **Was this project linked to improving workforce readiness skills?**
Yes, it was. The computer-based program was developed using WorkKeys, and basic job skills are covered in the mathematics concepts.
- **Did you evaluate the impact of this project?**
Yes, we did. Data was collected over three years based on how students' performance increased after using the program. The program worked well for all groups, even those groups who may not respond well to traditional teaching methods. At-risk and special education students performed as well as regular education students, and minority students also performed well using the program.
- **Do you know of any other practitioners/teachers who have used this project?**
Yes, the computer-based program, KeyTrain, is sold nationally.