Maximizing Academic Opportunities for Students in CTE Programs

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The Context: Since the mid-1980s we have:

Added the equivalent of one full year of core academics (math, science, language arts) to high school graduation requirements.

- (NAEP) **Reading scores have remained unchanged**
- (NAEP) **Science scores have remained unchanged**
- (NAEP) **Math scores have remained unchanged**
15 year olds in the US on the PISA:

- Performed below average in mathematics in 2012 and is ranked 26th among the 34 OECD countries
- Showed no significant change in this performance over time.
- Have particular weaknesses in performing mathematics tasks with higher cognitive demands, such as taking real-world situations, translating them into mathematical terms, and interpreting mathematical aspects in real-world problems.
Taking more math is no guarantee

- Only 26% of students who took Alg I, II & Geometry scored a 22 (ACT Benchmark) on the ACT exam scoring an average of 17.7
- Adding Trig increases to the average score to 19.9
- Not until calculus is added, does the average score exceed 22 – 5 years of high school math.
- 43% of ACT-tested Class of 2005 who earned A or B grades in Algebra II did not meet ACT College Readiness Benchmarks in math

1. ACT, Inc (2004) Crisis at the Core
Curriculum Integration Research

- Math-in-CTE: complete
  - Technical Assistance
- Literacy-in-CTE: complete
  - Technical Assistance
- Science-in-CTE:
  - Study recently concluded
Math-in-CTE: What we found

- Students in the experimental classes scored significantly higher on Terra Nova and Accuplacer
- The effect: 71st percentile & 67th percentile
- No negative effect on technical skills
- 11% of class time devoted to enhanced math lessons
Power of the New Professional Development Model

Math in CTE Use 1 Year Later

- Math teacher Partners
- Experimental CTE Teachers
- Control CTE Teachers

Old Model PD
New Model PD
Total Surprise!
Experimental Test of Reading Interventions in CTE
(Authentic Literacy study)

- Significant improvement from both approaches
- Teachers with two-years experience in method had greater effect
What We Learned: Science-in-CTE
Experimental Test of Science Integration

- Pilot intervention improved science achievement of students in the second, third, and fourth quartiles
- Full Study: Overall, no effect
- However, significant effect for nonwhite males and females

NRC CTE
National Research Center for Career and Technical Education