



Making Science Relevant Raises Engagement and Grades among Students at Risk for Low Achievement

RESEARCH SUMMARY | JULY 2015

It's the classic student comeback: When am I ever going to need [fill in the blank—algebra, biology, physics...] in my life? Parents and teachers may shake their heads, but what if the students are on to something?

STUDIES SHOW THAT 40 PERCENT TO 60 PERCENT of high school students are “chronically disengaged.”¹ Their boredom could very well reflect a deeper disconnect: they frequently don't see how what they learn in school applies to “real life.” A 2006 study, for example, found that 81 percent of those who dropped out of school claimed that “opportunities for real world learning” would have helped them stay in school.² Career academies—which directly connect curriculum to future work opportunities—continue to outperform many other approaches to engaging young people, particularly African-American and Latino males.³

The question, then, is would making high school classes more personally relevant and meaningful engage students more deeply? That was what Chris Hulleman

and Judith Harackiewicz asked about science class in their 2009 Science study.⁴

Specifically, they asked, would making science courses personally relevant and meaningful...

- Engage students in the learning process more deeply?
- Help students identify with future careers in science?

STUDY DESIGN

Although making school more personally relevant makes intuitive sense, few studies have managed to tease apart the role of “relevance” from the many other classroom influences (such as mentoring, more time on the topic,

The more relevant science was to students, the greater was their interest in science, the greater were their expectations for success in science classes, and the better they did in class.

Featured Article: Hulleman, C. S., & Harackiewicz, J. M. (2009). Promoting interest and performance in high school science classes. *Science*, 326, 1410-1412.

**MINDSET
SCHOLARS
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Hosted at the Center for Advanced Study in the Behavioral Sciences at Stanford University, the Mindset Scholars Network is a group of leading social scientists dedicated to improving student outcomes and expanding educational opportunity by advancing our scientific understanding of students' mindsets about learning and school.

and hands-on activities) that could influence engagement. To separate these other influences, Hulleman and colleagues turned to the same technique used in drug trials—randomized control and experimental groups. They randomly assigned one group of 126 ninth graders to a control group and 136 others in the same school to an experimental group.⁵ They then asked the experimental group to write essays throughout the semester (they wrote five essays on average) about the usefulness and utility of the science course material to their own lives (which essentially made them think about the relevance of science in their lives). The control group wrote only general summaries of the material they were studying without any reference to relevance.

The researchers took a baseline measure of students' initial interest in science and their expectations for success in the course. At the end of the semester, they measured students' grades,⁶ their interest in science, and their future plans to pursue science-related courses and careers. The researchers were particularly interested in how making science relevant might empower students who were disengaged and lacked confidence and interest in science.

Students in the experimental group with lower expectations for success in science improved by nearly two-thirds of a letter grade over those in the control condition.

MAKING SCIENCE RELEVANT TO “REAL LIFE” ENGAGES STUDENTS AT RISK OF LOW ACHIEVEMENT

As predicted, the more relevant science was to students, the greater was their interest in science, the greater were their expectations for success in science classes, and the better they did in class, as measured by second-quarter grades. The more disengaged students had the strongest results, while the intervention had no effect on those who were already performing fairly

well. Students in the experimental group with lower expectations for success improved by nearly two-thirds of a letter grade over those in the control condition. Interest in science at the end of the semester was a significant predictor of interest in future science-related courses and careers.

Bottom line: making science relevant to students' lives promotes both interest and performance for those students at most risk of disengaging. An added bonus is that doing so can be easily incorporated into almost any course with little cost to the instructor.

¹ Marks, H. M. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Educational Research Journal, 37*, 153-184. “Disengaged” means that students were inattentive, exert little effort, fail to complete tasks, and claimed to be bored.

² Bridgeland, J. M., Dilulio Jr, J. J., & Morison, K. B. (2006). *The silent epidemic: Perspectives of high school dropouts*. Civic Enterprises.

³ Kemple, J. J. (2008). *Career Academies: Long-term impacts on work, education, and transitions to adulthood* New York: MDRC. Retrieved from: <http://www.mdrc.org/publication/career-academies-long-term-impacts-work-education-and-transitions-adulthood>

⁴ Hulleman, C. S., & Harackiewicz, J. M. (2009). Promoting interest and performance in high school science classes. *Science, 326*, 1410-1412.

⁵ The study was conducted with 262 high school students taught by seven science teachers (biology, integrated science, and physical science) from two high schools in a small midwestern city. 92% were ninth-graders and the rest were tenth-graders. 52% were female, 66% white, 15% African-American, 12% Asian-American, and 8% Hispanic. Because students wrote about science topics in both the control and experimental groups,

the study controlled for topic knowledge.

⁶ They measured the grades of 100 of the students in one of the schools.