Researchers Receive $2.4 Million Grant to Improve 9th Grade Math in 44 High Schools Across the Greater Philadelphia Region

The 21st Century Partnership for STEM Education (21PSTEM), in partnership with Villanova University, has received a $2.4 million grant from the National Science Foundation to implement a transformative assessment paradigm to encourage more students to stay in school and excel in mathematics in 44 high schools throughout the Greater Philadelphia region (including Bucks, Delaware, Lehigh, and Montgomery counties).

The study, titled Proficiency-based Assessment and Reassessment of Learning Outcomes (PARLO), is designed to measure whether a new system of a proficiency-based, continuous assessment of learning encourages more students to persist in taking more difficult courses, to stay in school and to score better on math tests.

Dr. Michael Posner, Assistant Professor of Mathematical Sciences at Villanova University, and co-principle investigator on the grant, uses PARLO in his statistics classes. Dr. Posner found that students who require additional time to master material performed equally well on a common final exam as “early learners” and that attitudes towards statistics in the PARLO group were higher than those in a control class. According to Posner:

PARLO encourages late learners who struggle with mathematics to continue to try to learn by providing them with multiple opportunities to learn content and resubmit assignments until they demonstrate proficiency on a high priority set of learning outcomes. In this new classroom dynamic, students assume more responsibility for and become active agents in their own learning without the stigma of being a ‘failure.’

The grant arrives at a pivotal time in education as districts work to close achievement gaps between groups of students, and also supports President Obama’s commitment to strengthening mathematics and science education in grades K-12.

Directing the four-year study is Dr. Nancy Lawrence, a senior researcher at The 21st Century Partnership. Said Lawrence:
The implications of a proficiency-based grading system are exciting and potentially profound. It replaces the broken mind-set that students should have just one opportunity to demonstrate their understanding of particular mathematical concepts before a pacing guide, and tradition, demand they move on to new material. Some students just need more time and more opportunities to reach proficiency and PARLO gives them both, without penalizing them.

Teachers participating in the study will receive professional development in creating learning outcomes in mathematics, implementing formative assessment techniques and a proficiency-based grading in their classrooms. The PARLO system is also supported by software that allows teachers, students, and parents on-demand web-based access to monitor individual student progress on multiple learning outcomes. For their part, teachers adopt instructional strategies and techniques that support their students' ongoing and continuous learning, including defining learning outcomes, providing frequent and individualized feedback, and participating in professional development.

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The 21st Century Partnership for STEM Education also manages other major NSF and U.S. Department of Education research grants: see www.mspgp.org and www.cogscied.org. It is the largest provider of professional development and policy research in STEM the region.