Intradisciplinary Perspectives on the Contributions of Psychology to Mathematics and Science Education—A Response to the Presidential Task Force on Mathematics and Science Education: From one Science Educator's Perspective

Laura Maitland, Former Science Chair of Bellmore-Merrick CHSD

Statement of Purpose

"The purpose… is to contribute to systemic reform in science and mathematics education by identifying significant research that can enhance learning and teaching in these key areas, and to examine the relation of theories in education and psychology to the current curriculum reform debate. Scientists, mathematicians, psychologists, K-12 science and mathematics teachers, and education researchers working on learning, memory, curriculum, and instruction,

will meet in an effort to bridge the gap between current knowledge and its application to learning and teaching of science and mathematics. Future research and training needs for teacher enhancement will also be identified.”

Does this sound familiar?

It’s not a quotation from this Presidential Task Force, but rather taken from the Wingspread Conference **Research To Practice: Improving Teaching and Learning of Science and Mathematics** (1992) sponsored by the Council of Scientific Society Presidents and The Johnson Foundation.

What’s happened since then?

Science Education has changed since 1992--

- National Science Education Standards were developed by the National Research Council
- Project 2061 Benchmarks were developed by the American Association for the Advancement of Science
- States developed their own standards based on either or both of these documents
- States decided science requirements for graduation
- “No Child Left Behind” has required limited testing in science

Psychology has influenced changes in instruction, curriculum, and assessment in a variety of ways--

- Science teachers recognize the need to find out what students already know
- Multimodal instruction (with graphic and verbal representations) is common
- Accessibility of concepts has increased with greater use of contextualization and personalization in lessons
- Lesson structures adopted by many educators already incorporate suggestions from this Task Force (ex. POGIL.org)

How can psychologists best impact science instruction more significantly right now?

- Help science educators design better summative assessments and scoring rubrics that are sensitive to inquiry instruction because ***teachers teach what is tested.*** (Today's state tests fall very short of this goal.)
- Help develop an understanding of how to best uncover and overcome misconceptions that require radical re-conceptualization, not only in K-12 students, but also in their teachers.

How can psychologists best impact science instruction later?

- Help determine the underpinnings of science necessary for everyone to know in order to sustain a critical thinking electorate.
- Accomplish all of the other goals iterated in the Presidential Task Force (2008) report!