AMATYC Webinar October 2, 2018

Funded by the National Science Foundation, Grant #1737946
In Math this might not be as funny...
“Much that is taught in high school is not needed, much that is taught in middle school is not learned, and some topics that are needed are neither taught nor learned.” – *What Does It Really Mean to be College and Work Ready?* A report from the National Center on Education and the Economy (NCEE), 2013
The Instigators

Michael Hacker, Co-director, Center for STEM Research at Hofstra University, Hempstead, NY (Project PI)

Paul Horwitz, Senior Scientist, Concord Consortium, Concord, MA (Project Co-PI)
STEERING COMMITTEE MEMBERS

- Marilyn Barger, Director, Florida ATE Center (FLATE), Hillsborough Community College, Tampa, FL.
- Rosemary Brester, President and CEO, Hobart Machined Products, Hobart, WA.
- Sol Garfunkel, Director of the Consortium for Mathematics and Its Applications (COMAP), Bedford, MA
- Michael Hacker, Co-director of the Center for STEM Research at Hofstra University, Hempstead, NY
- Katherine Hughes, Research Lead, former CCRC Deputy Director, Washington DC
- Paul Horwitz, Senior Scientist, Concord Consortium, Concord, MA
- Jennifer Lazare, Biotech Instructor, Anderson HS and Austin CC, TX
- Rodney Null, James A. Rhodes State College, Lima, OH
- Gerhard Salinger, retired NSF program officer and originator of the ATE program, Albuquerque, NM
- Lisa Seidman, Former Program Director in Biotechnology, Madison Area Technical College, Madison, WI
- Gordon Snyder, co-Principal Investigator at the National ATE Center for Optics and Photonics Education, Waco, TX
  - Debbie Hecht, Evaluator. Susan Siegal, Editor. Lois Miceli, Adm. Ass’t.
Held January 12th to 14th, 2018 in Baltimore, MD

Aimed primarily at entry-level STEM jobs and community college graduates

Brought together 50 invited participants in three groups:
- STEM employers in three discipline areas:
  - Advanced Manufacturing
  - Information/Communication Technology
  - Biotechnology
- High school and community college instructors in those STEM disciplines
- Mathematics educators and researchers

Employers provided 29 representative workplace problems which served as a basis for analysis.
Charge to the Conference

Our charge, and the major intended Conference outcome, is to begin to identify possible changes in curriculum and instruction that will reflect the mathematics needed by entry-level STEM technicians to be successful and productive employees.
Webinar participant input

- Questions or comments, so far…

- What would you guess are a couple of the findings?
The Findings
There is a gap between the typical textbook problem and the problems that arise on the job, even though the underlying mathematics may be the same.
There is a gap between the mathematical preparation many students receive and the mathematical requirements of an increasingly technological workplace.
Too many students cannot make effective use of technology commonly found in the workplace.
As currently taught and assessed, math education has become a barrier to success for many students rather than the pathway to it.
Summary

The issues raised by the Conference are not new. Significant initiatives have been undertaken to address the problems, yet they persist. Ultimately, ensuring the mathematics preparedness and competency of STEM technicians is the shared responsibility of all stakeholders. To effect real change and improvement, each community has an important role to play, and collaboration among all stakeholders: employers, instructors, mathematics educators, and parents must be ongoing.
Webinar participant input

- Questions or comments…

- How would you suggest addressing the issues raised by the findings?
So, where do we go from here?

Recommendations
From
The Needed Math Project
Place greater emphasis on contextualized instruction at all grade levels and in all mathematics courses.
R2

- Make a shift in emphasis in the assessments that students must take.
R3

- In all mathematics courses, increase the focus on topics, approaches, and pedagogy that better reflect the demands of the contemporary workplace.
R4

- Establish a separate mathematically rigorous pathway based on solving realistic problems representative of those that many students will encounter after they leave school.
Create a Needed Math Center charged with communicating conference findings to additional stakeholders by holding follow-on meetings and publishing articles aimed at a wide variety of audiences.
Webinar participant input

- Questions or comments...

- Do theses recommendations seem relevant and actionable?
And furthermore

Take-a-ways and ruminations from the two “math” guys
Employers related some interesting things:

- Math is a valued commodity.
- There is concern about availability of a qualified workforce.
- They need to be able to, “think”.
- They know the math, but they can’t use it to…
Ultimately, from the perspective of the student turned employee…

- The first real job after degree completion will likely not be his/her last job.
- They need to learn more than how to do specific task they are initially assigned to.
- They need to learn to model, that is adapt and apply the mathematics they know to new context as job demand and technology change.
Webinar participant input

- Final questions or comments…

- Want more?
Continue the Discussion

http://www.neededmath.org/ATE

At 44th AMATYC Annual Conference

• Friday (November 16th, 8:00-8:50am) Chat & Chew with Aaron Altose and Rodney Null
• Saturday (November 17th, 1:05-1:55pm, S143) panel discussion with Michelle Younker, Solomon Garfunkel, Rob Kimball, and Stefan Baratto
Thanks for participating!

Sol & Rod