



## EXECUTIVE SUMMARY

### *IMPACT: Improving Mathematical Prowess And College Teaching*

Teaching mathematics in the 21st century brings new opportunities and challenges to the mathematics community, especially in the first two years of college. The American Mathematical Association of Two-Year Colleges (AMATYC) has led the way in developing standards for intellectual development, content, and pedagogy. *IMPACT: Improving Mathematical Prowess And College Teaching* builds upon the content of *Crossroads in Mathematics* and *Beyond Crossroads: Implementing Mathematics Standards in the First Two Years of College*. It is research-based and uses the experiences of individuals invested in mathematics in the first two years of college. Information has been gathered for this document from AMATYC members and others through focus groups, personal interviews, and research by the writing team.

The goal of *IMPACT* is to improve mathematics education in the first two years of college by presenting clear guidance on how to impact the mathematical prowess of students. AMATYC has created four pillars of PROWESS as an innovative way to enhance our students' mathematical ability and bravery through recommendations for continuous improvement of teaching in the first two years of college. These pillars are the key themes of the *IMPACT* document:

Making an IMPACT on Mathematical PROWESS
<p><b>Proficiency:</b> <i>Developing Students' Mathematical Knowledge</i> Irrespective of a student's academic pursuits, mathematical proficiency is critical to being a functioning member of society. Students need to: know mathematics procedures, execute core computations fluently, view mathematics as relevant to their daily lives, demonstrate mathematical understanding, utilize the structure in the mathematics to solve problems, apply mathematics to everyday situations, and communicate mathematically.</p>
<p><b>Ownership:</b> <i>Taking Responsibility and Showing Initiative</i> Faculty should work towards empowering students to take ownership of their learning by promoting self-regulated learning. For faculty, ownership involves being a reflective practitioner who examines curricula and teaching practices to identify areas that need improvement. For departments and institutions, ownership requires supporting faculty in their teaching.</p>
<p><b>Engagement:</b> <i>Developing Intellectual Curiosity and Motivation in Learning Mathematics</i> Engaging students intellectually in the process of learning mathematics through active and cognitive activities is fundamental for improving student achievement. Likewise, engaging faculty in the pursuit of excellence in teaching through innovative best practices results in an invigorated commitment to teaching and innovation, which benefits students, the department, the college, and society as a whole.</p>
<p><b>Student Success:</b> <i>Stimulating Student Achievement in Mathematics</i> Stimulating student success requires the entire college community to work together to advise and place students into appropriate pathways while creating a positive learning environment to maximize their success. Producing and sustaining a learning environment that promotes student success should be implemented by utilizing a collaborative spirit that unites college leadership, faculty, staff, and policy makers.</p>

*IMPACT* uses the concept of these four pillars as an effective catalyst for research in the two-year college as they provide a rich foundation for moving the research agenda forward. Research in mathematics education at the two-year college level is emerging as a vital field of inquiry for understanding the complexities of teaching and learning mathematics. The emphasis on research is demonstrated in two primary ways: by modeling the use of research in the document itself and by the inclusion of a chapter dedicated to the craft of research.

Improving the mathematical prowess of students and moving the research agenda forward involves multiple collaborators. However, change is not easy. *IMPACT* provides successful examples of collaborative innovation that demonstrate what is possible. This guidance is meant to inspire faculty, departments, institutions, and policymakers to examine, assess, and take action to improve every component of mathematics education in the first two years of college. The intent is to:

- Provide guidance to faculty to design and implement instructional programs that foster mathematical prowess in students
- Share successful models of redesigned mathematics curricula that will revitalize faculty and departments to engage in meaningful conversations as well as implement evidence-based strategies, courses, and programs
- Inform policy makers and legislators of the needs and challenges ahead for students and institutions and subsequently, help implement policies that will lead to student success.

*IMPACT* contains more than merely a list of recommendations for making an impact. It is a document which can be used for professional growth as well as a framework to make significant changes at the individual, departmental, and college levels. Not only can students become empowered to increase their mathematical proficiency when the ideas of *IMPACT* are implemented, but we envision students taking ownership of their learning while engaging in the learning process. Faculty, with the support of their institution, will focus on facilitating a conceptual understanding of mathematics and building procedural fluency, in addition to student engagement and success. Visit the AMATYC website to learn more about the document and IMPACTLive! which is a portal that will provide opportunities for both synchronous and asynchronous interaction between members as well as a go-to resource for lesson plans, worksheets, and projects on various mathematical topics. Join us to make an impact and start a ripple effect of change in mathematics education.



*The IMPACT graphic illustrates the ripple effect that a single action can create. All individuals have the power to generate ripples to influence positive change in the mathematics learning environment.*