

Research Ideas

Beyond Crossroads

(Excerpts from Beyond Crossroads)

Basic Principles. The foundation of all the standards presented in Beyond Crossroads:

- **Assessment.** The assessment of student learning in mathematics should be a fundamental tool for the improvement of instruction and student learning.
- **Broadening.** Mathematics courses and programs in the first two years of college should broaden students' options in educational and career choices.
- **Equity and Access.** All students should have equitable access to high-quality, challenging, effective mathematics instruction and support services.
- **Innovation.** Mathematics programs should be thoughtfully constructed to approach content and instruction with appropriate use of traditional and innovative methods.
- **Inquiry.** Effective mathematics instruction should require students to be active participants.
- **Quantitative Literacy.** Quantitative literacy should be integrated throughout the mathematics program and the college curricula.
- **Relevance.** The mathematics that students study should be meaningful and foster their appreciation of the discipline.
- **Research into Practice.** The practice of mathematics teaching should be guided by research on teaching and learning.
- **Technology.** Technology should be integral to the teaching and learning of mathematics.

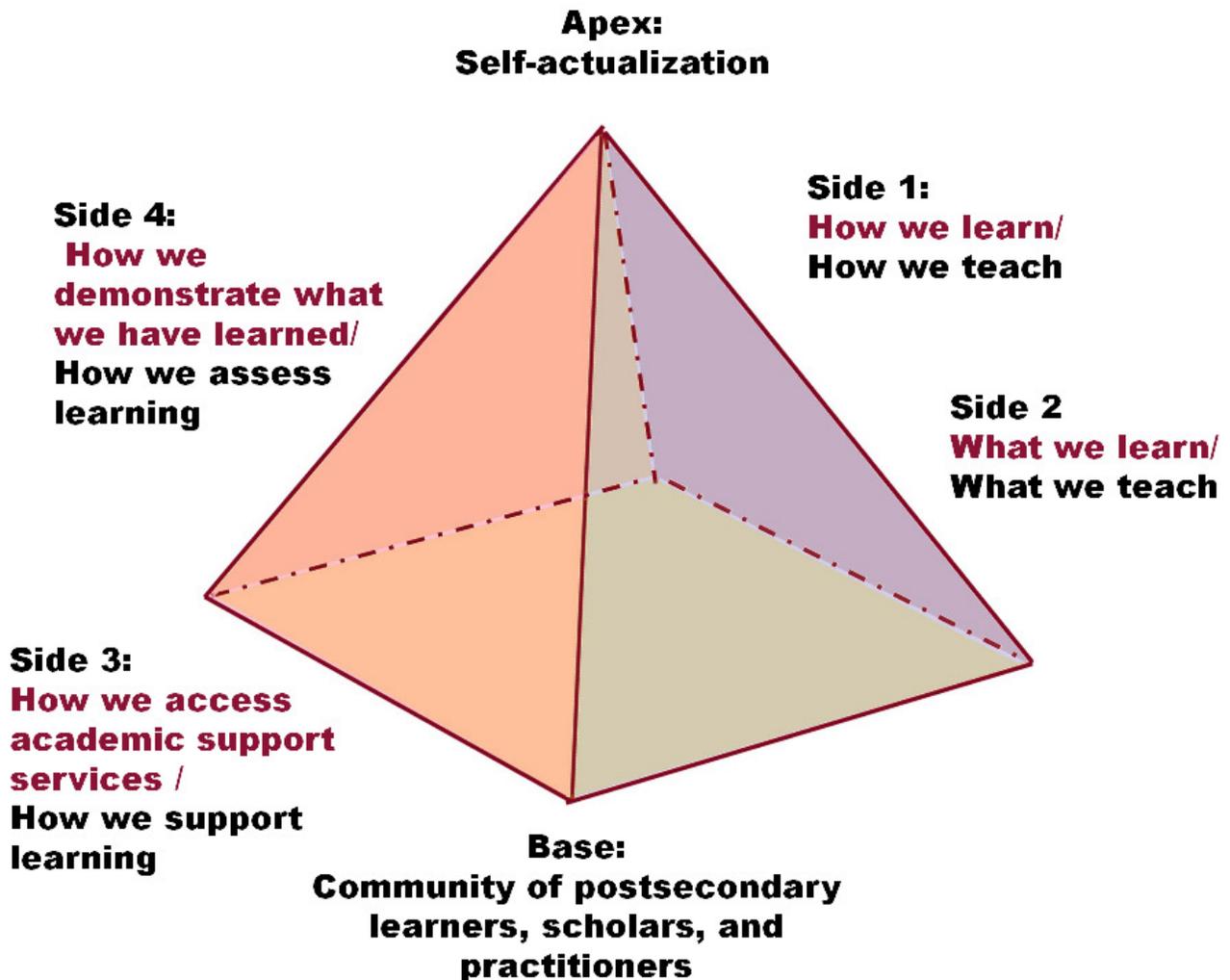
Implementation Standards

Beyond Crossroads introduces five Implementation Standards that extend the Standards for Intellectual Development, Content, and Pedagogy presented in the 1995 Crossroads in Mathematics. These five standards, with accompanying implementation recommendations and action items, are intended to guide the decision making of professionals in selecting and putting strategies into practice to meet the challenges of improving student learning in mathematics.

Implementation Standards. Guidelines for faculty, departments, and institutions for improving mathematics education:

- **Student Learning and the Learning Environment.** Mathematics faculty and their institutions will create an environment that optimizes the learning of mathematics for all students.
- **Assessment of Student Learning.** Mathematics faculty will use the results from the ongoing assessment of student learning of mathematics to improve curricula, materials, and teaching methods.
- **Curriculum and Program Development.** Mathematics departments will develop, implement, evaluate, assess, and revise courses, course sequences, and programs to help students attain a higher level of quantitative literacy and achieve their academic and career goals.
- **Instruction.** Mathematics faculty will use a variety of instructional strategies that reflect the results of research to enhance student learning.

- **Professionalism.** Institutions will hire qualified mathematics faculty, and these faculty will engage in ongoing professional development and service.



	IMID Model Incorporating Access and Equity for All Learners	Specific Activities That You Will Implement to Achieve the Goals of Access and Equity for All Learners
How we learn / How we teach	<p>Promote understanding of how knowledge and personal experiences are shaped by context.</p> <p>Work collaboratively to construct knowledge.</p> <p>Understand that learning is a complex process involving many layers – engage students in metacognitive reflection and strategies.</p> <p>Maximize student voices in all activities.</p> <p>Begin with lived experiences.</p> <p>Bridge lived experiences with academic content.</p> <p>Incorporate students’ natural approaches to problem solving.</p> <p>Incorporate critical thinking and meaning-making activities.</p> <p>Provide a variety and balance among individual, small group, and large group hands-on activities, discussions, presentations, investigative projects, and other in-class or homework assignments.</p> <p>Provide a welcoming and supportive environment.</p> <p>Use teaching methods that consider diverse learning styles, abilities, ways of knowing, and previous experiences and background knowledge.</p>	
What we learn / What we teach	<p>Determine essential course components.</p> <p>Emphasize the big ideas of the content subjects (major ideas, ways of thinking, problem solving).</p> <p>De-emphasize isolated, content-specific techniques, and components.</p> <p>Interface subject content with life-based questions that are relevant and important to the student population.</p> <p>Integrate multicultural and global perspectives within subject matter content.</p> <p>Relate content to historical trends, current events, and future directions.</p>	

	IMID Model Incorporating Access and Equity for All Learners	Specific Activities That You Will Implement to Achieve the Goals of Access and Equity for All Learners
How we access academic support services / How we support learning	<p>Use intrusive means to exposes students to one-on-one, small group, technology-based, and other academic support services.</p> <p>Allow students multiple venues or provide multiple modes for “time-on-task” activities.</p> <p>Provide services or opportunities that scaffold the learning process.</p> <p>Use assignments and assessments as “candid snapshots” that can revised, revisited, or retaken</p>	
How we demonstrate what we have learned / How we assess learning	<p>Balance the weight of all assessment methods (formative and summative) so that all learning styles are supported and acknowledge when evaluating the essential components.</p> <p>Create multiple approaches for demonstrating mastery of course materials.</p> <p>Use formative reflection journals for assessing “what is working” and “what is not working” throughout the semester.</p> <p>Establish and communicate clear expectations in terms of learning objectives and engagement and evaluation measures in the teaching and learning process.</p>	

IRB Guides (How to protect human subjects in research) and Resources

A 5-module tutorial (with quizzes) on how to prepare, implement, and maintain records to protect human subjects in research: [University of Minnesota](http://www.research.umn.edu/consent/menu_soc.html) --
http://www.research.umn.edu/consent/menu_soc.html

Another tutorial (and an excellent overview) on the Protection of Human Subjects in Research (60 minute module): [University of Vermont](http://www.uvm.edu/irb/tutorial/) -- <http://www.uvm.edu/irb/tutorial/>

An example of online testing to assess knowledge & judgment of Informed Consent and the Protection of Human Subjects: [Brigham Young University](http://orca.byu.edu/irbtutorial/start.asp) -- <http://orca.byu.edu/irbtutorial/start.asp>

A PowerPoint overview of the IRB: [Vanderbilt](http://www.mc.vanderbilt.edu/irb/tutorial/) -- <http://www.mc.vanderbilt.edu/irb/tutorial/>

A brief PowerPoint on the IRB process: [Pepperdine](http://faculty.pepperdine.edu/mfeltner/IRB/GPSchoolsIRB/GPS_Educ_Jan2004_files/frame.htm) --
http://faculty.pepperdine.edu/mfeltner/IRB/GPSchoolsIRB/GPS_Educ_Jan2004_files/frame.htm

Federal guidelines for IRBs: [Federal Government](http://www.hhs.gov/ohrp/documents/OHRPRegulations.pdf) --
<http://www.hhs.gov/ohrp/documents/OHRPRegulations.pdf>

Links for Research Ideas and Funding

Overview with modules: [University of Wisconsin--Milwaukee](http://www.uwm.edu/Dept/RSA/Public/IRB/tutorial/) --
<http://www.uwm.edu/Dept/RSA/Public/IRB/tutorial/>

Other sites:

<http://www.maa.org/features/rumec.html>

<http://www.nsf.gov/pubs/2010/nsf10544/nsf10544.pdf>

Grant Writing

<http://www.mcf.org/mcf/grant/writingagrantproposal.pdf>

http://nordp.org/resources/writing_a_grant.php

<http://www.nsf.gov/pubs/1998/nsf9891/nsf9891.htm>

<http://www.nsf.gov/pubs/policydocs/pappguide/nsf11001/gpgprint.pdf>

http://www.nsf.gov/pubs/policydocs/pappguide/nsf11001/aag_index.jsp?org=NSF

Guidelines for Proposal Writing

Review guidelines, priorities, as well as proposal review criteria. Use the language of the proposal guidelines in your document. Volunteer to be a reviewer of proposals to learn the inside track. Example projects include the following (next page):

<http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0942186>

<http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0942843>

<http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0942569>

<http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0920057>

<http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0737455>

<http://www.carnegiefoundation.org/newsroom/press-releases/five-foundations-fund-initiative>

Sponsored Information Network ([SPIN](http://www.infoed.org/new_spin/spinmain.asp)) -- http://www.infoed.org/new_spin/spinmain.asp