



# Chapter 8

## Professionalism

Professionalism with its core values of expertise, autonomy, commitment, and responsibility<sup>1</sup> is at the heart of improving student success in mathematics. All two-year college mathematics faculty need to possess a strong academic preparation, participate in supportive professional development, exhibit the capacity for change and improvement, and shoulder the responsibility of carrying out multifaceted professional activities. Growing in knowledge of both mathematical content and pedagogical strategies, providing quality instruction, and exhibiting professional excellence are the results of deliberate faculty action.

### **Implementation Standard: Professionalism**

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

### **Hiring and Mentoring Mathematics Faculty**

One of the most important activities of a mathematics department is determining criteria for hiring new faculty. When choosing the best-qualified person for a vacancy, mathematics departments in two-year colleges should expect all candidates (full-time and adjunct) to have achieved the following:

- ♦ have earned at least a master's degree in mathematics or in a related field, which includes at least 18 hours of graduate-level mathematics<sup>2</sup>
- ♦ be knowledgeable in learning and teaching theory, the use of technology, and pedagogical strategies
- ♦ demonstrate evidence of professional involvement
- ♦ be familiar with and supportive of the mission of two-year colleges.

Candidates who have participated in teaching internships or in professional activities focusing on college teaching should be given particular consideration.<sup>3</sup> Understanding how students learn and applying appropriate and varied teaching strategies are important components of a mathematics faculty member's preparation.

**Organizations providing higher learning must have qualified faculties—people who by formal education or tested experience know what students must learn—who create the curricular pathways through which students gain the competencies and skills they need.**

North Central Association of Colleges and Schools,  
*The Higher Learning Commission Handbook of Accreditation*,  
2005, p. 3-2-10.

In addition to general qualifications in mathematics, faculty who will teach specialized courses need specialized preparation in the following areas:

- ◆ developmental mathematics—knowledge of mathematics anxiety and associated coping strategies, motivation techniques, and student learning styles
- ◆ technical mathematics—hands-on experience in the workplace
- ◆ teacher preparation—solid grounding in pedagogy with connections to and experiences in the pre-K–12 school sector
- ◆ mathematics-intensive—an especially strong academic background in advanced mathematics
- ◆ statistics—an academic background in statistics that includes the study of at least two advanced statistical topics, such as multiple regression and analysis of variance.

Decreasing enrollments in undergraduate and graduate mathematics programs and competition from higher-paying technical careers present new and continuing challenges in recruiting and hiring qualified mathematics faculty. Because there is a critical shortage of qualified and capable applicants to fill the growing number of vacancies in mathematics departments, institutions and mathematics departments need to be proactive in the recruitment process to assure that the pool of applicants for both full-time and adjunct positions is sufficient and as diverse as possible. Diverse faculty contribute to social equity and also serve as vital role models for all students.<sup>4</sup>

Once hired, faculty new to the teaching profession should be provided with the orientation and mentoring needed to ease the transition into the institution and into the classroom. The orientation should also help them become familiar with departmental expectations and the needs of the college's diverse student population, and help them develop as leaders in their institution and in the professional mathematics community. "Mentoring is useful and powerful in understanding and advancing organizational culture, providing access to informal and formal networks of communication, and offering professional stimulation to both junior and senior faculty members."<sup>5</sup> Mentoring has a natural cycle of four parts and must be customized to meet individual needs:<sup>6</sup> (1) assignment and getting acquainted; (2) development of goals, procedures, and expected outcomes; (3) development of mutual confidence and satisfaction as goals are accomplished; and (4) discontinuation of mentoring when it is no longer needed. The mentoring process benefits both the mentor, who is often renewed, and the faculty member being mentored, who can become empowered. An effective mentor is a respected role model, a good listener, and a skilled communicator—flexible and responsive, informed and influential, encouraging and positive, and committed to the mentoring process.

**Implementation recommendation:** Two-year colleges will recruit, hire, orient, and mentor a qualified and diverse mathematics faculty.<sup>7</sup>

### Actions to support this recommendation

Faculty actions:

- ◆ participate in developing criteria and hiring new faculty
- ◆ serve as mentors to other faculty.

Departmental/institutional actions:

- ◆ develop and apply suitable criteria for hiring new faculty
- ◆ be proactive in encouraging underrepresented groups to explore and engage in teaching careers
- ◆ advertise personnel vacancy notices widely; contact professional organizations, graduate schools, and other entities to broaden the applicant pool

- ♦ provide new faculty with activities and resources to ease their transition into the institution and the department
- ♦ offer a faculty mentoring program where qualified and experienced faculty mentor less experienced full-time and adjunct faculty
- ♦ provide opportunities for faculty to develop as leaders in their department, institution, and profession.

## Professional Development and Service

Professional growth is the personal responsibility of each faculty member with support from the department, the college, and professional organizations. Professional development activities can be the key to fostering improvement in a mathematics department. Such activities enhance an instructor's mastery of content, knowledge of teaching, and self-esteem. By actively participating in faculty development, faculty can be aware of and implement major developments in content, pedagogy, and the effective use of technology. Effective teaching is a result of faculty preparation, experience, reflection, and continued professional development. Professional development may include sabbatical leave, as well as travel related to teaching, graduate coursework, group (or department) colloquia, individual study, learning about Internet resources, reading or writing scholarly journals, and virtual interest groups. These activities can result in an invigorated commitment to teaching and innovation, which benefits students, the department, the college, and society as a whole.

Mathematics departments and institutions should provide regular and comprehensive professional development programs serving both full-time and adjunct faculty. New full-time and adjunct faculty especially need to be encouraged to participate in departmental activities, discussions of curricular and pedagogical issues, and decisions regarding textbook selection. Regular department meetings involving full-time and adjunct faculty to discuss implementation of new or different instructional practices and program assessment promote change across the department. All too often, curricular and pedagogical change is driven by one person in the department. While one person *can* be a catalyst for change, the department may revert to an earlier status quo when the person leaves the institution. Lasting change requires the involvement of the entire department. Effective instructional change also requires involvement and commitment of the college administration supporting the department's goals and activities to maintain a quality mathematics education for all students.

Faculty can contribute to the profession by presenting workshops on topics such as teaching, learning, and curriculum design. They may also write articles for journals, reviews, textbooks, textbook supplements, or online materials. Faculty working together can contribute to the ongoing implementation of standards-based mathematics education. Engaging in discussions on curriculum issues, course development, teaching schedules, course delivery modes, and related topics help to establish curricular direction and priorities of the department. Equally important are discussions, both formal and informal, about teaching strategies to foster a supportive climate for student learning. Active involvement in campus-wide initiatives and service on college-wide committees build working relationships with colleagues from other departments. As faculty develop interdisciplinary courses and integrate student learning outcomes across disciplines, the academic community is strengthened, and students have more opportunities to appreciate the applications of mathematics.

Grantsmanship provides another avenue for mathematics faculty to engage in professional service. Successful grant applications can support research and other professional development activities, and fund the acquisition of needed instructional equipment. Two-year colleges can encourage faculty to work on grant proposals by awarding reassigned time for writing and providing grant personnel to assist with proposal preparation and grant administration. Once a grant has been received, the institution can support faculty with grant-funded reassigned time and summer remuneration.

**Professional service fosters the building of a community of lifelong learners, who value expertise and encourage collaboration.**

Ana Jiménez,  
Project ACCCESS Fellow,  
Pima Community College,  
Tucson, Arizona,  
2005

Participation in professional organizations and societies is critical for professional growth. Professional organizations offer faculty numerous opportunities for professional development and promote enriching interaction and networking among mathematics educators across the country. Mathematics organizations also represent the interests of colleagues and the mathematics profession in national and international educational dialogues. At conferences offered by professional organizations, faculty can network with colleagues from other colleges, attend workshops and sessions helpful to their teaching practice, exchange ideas about teaching and learning, and examine the products and services exhibited by publishers and other companies serving the mathematics community. Funding professional development is always an ongoing personal and institutional challenge. Institutions can be proactive in providing internal funding, released time for faculty to pursue projects or attend professional meetings, and substitutes for missed classes.

Faculty have a stake in the betterment of the mathematics community at large. Building ties with faculty in K–12 schools is extremely useful, as is forming partnerships with business and industry. Team-teaching within colleges and between two-year and four-year institutions can strengthen the mathematical curriculum and teaching, and help foster an understanding of each institution’s culture and environment.<sup>8</sup> Faculty can also help to build public support for mathematics education and work to diffuse the mathematics anxieties so prevalent in our society.

**Implementation recommendations:** Mathematics faculty will recognize that their professional responsibilities extend beyond the classroom. They will engage in professional activities within the department, the college, the mathematics education community, and outside communities to enhance mathematics curricula and instruction. Mathematics department chairpersons and college administrators will provide faculty with opportunities and support in their professional development efforts.

### Actions to support these recommendations

Faculty actions:

- ◆ participate in significant professional development activities on a regular basis, including discussions about courses, programs, teaching methods, education research, and how to improve student learning in mathematics
- ◆ communicate the mathematical needs of students to faculty in other disciplines
- ◆ participate in consensus-building within the department and the college regarding student outcomes in mathematics courses and programs
- ◆ build collegiality and academic respect across disciplines for mathematics curricula and instruction
- ◆ be actively involved in professional organizations.

Departmental/institutional actions:

- ◆ hold regular meetings for full-time and adjunct faculty for sharing teaching strategies and review of curricula
- ◆ invite adjunct faculty to participate in departmental activities<sup>9</sup>
- ◆ provide faculty development activities to help faculty respond to major developments in content and pedagogy, including the effective use of technology<sup>10</sup>
- ◆ provide all full-time and adjunct faculty with reassigned time, substitutes, or financial support for professional development
- ◆ encourage the participation of underrepresented groups in professional activities.

## The Scholarship of Teaching and Learning Mathematics

The “scholarship of teaching and learning (SoTL)” differs from traditional teaching in that it emphasizes teaching and learning as legitimate areas of scholarship. Faculty engaged in the scholarship of teaching and learning “frame and systematically investigate questions related to student learning—the conditions under which it occurs, what it looks like, how to deepen it and so forth—and do so with an eye not only to improving their own classroom but to advancing practice beyond it.”<sup>11</sup> SoTL methods take many forms, ranging from simple critical observation of classroom patterns, to the use of classroom data to try out new classroom strategies, to research that compares testing methods to see which method best maximizes learning. The student is the focus of the teaching activity and the classroom becomes a laboratory in which data are collected and openly shared with peers for the purpose of improving the profession.

Documenting the achievement of mathematics students and the effectiveness of instructional strategies and using those results of that research to make valid improvements in mathematics programs can help to enhance student learning in mathematics. Self-assessment and professional reflection are powerful tools for improving teaching and learning. Periodic classroom assessments<sup>12</sup> can enable faculty to make critical modifications in instructional attitude, behavior, and content. The use of videotapes, audio recordings, portfolios, skills check lists, minute papers, and reflective journals can provide the faculty member with information to change positively and affect teaching performance. Collecting feedback from students regularly, assessing the effects of teaching, and making necessary adjustments are essential activities of the reflective practitioner.<sup>13</sup> To be credible and useful, the results must become public and be shared.

Teaching should be connected to the disciplinary and professional communities in which faculty pursue scholarly work.<sup>14</sup> A key feature of the scholarship of teaching is the commitment of faculty to make their practices public, documenting their pedagogical work, and putting it forward for review. Teaching should be viewed as a process of ongoing reflection and inquiry that requires collegial exchange and openness.<sup>15</sup> Mathematics faculty should be proactive in comparing results of the assessment of their students’ learning outcomes with those of similar classes in the department. Strategies to communicate the findings from the scholarship of teaching include the use of the following resources:

- ♦ informal discussions among peers promoting excellence in teaching
- ♦ journals focusing on mathematics pedagogy that serve as vehicles for instructors to share what they know and do<sup>16</sup>
- ♦ newsletters for fellow practitioners (departmental, regional, state, or national)
- ♦ a collection of essays by faculty who are investigating teaching and learning in mathematics to document investigative work by sharing methods, approaches, reflection, and analysis and to provide a model for others
- ♦ Web sites that serve as clearinghouses for effective pedagogical practices
- ♦ digital and multimedia devices to demonstrate instructional strategies.

Faculty who persistently ask “Why?” even in ordinary circumstances develop a deeper, richer understanding as their research evolves. Applying the Implementation Cycle of *Beyond Crossroads* to a project such as implementing an innovative teaching method is a way for faculty to engage in the scholarship of teaching.

When we independently explore professional development opportunities, we nurture our own desire to learn and our excitement in the learning process...

Thoughtfully setting personal and professional priorities and then regularly reflecting upon these priorities is a vital aspect of continuing professional enrichment.

AMATYC,  
*Opportunities for  
Excellence:  
Professionalism and the  
Two-Year College  
Mathematics Faculty*,  
2001, p. 48.

**Implementation recommendations:** Mathematics faculty will regularly engage in empirical research on their teaching and share the results with peers for the purpose of improving student learning in mathematics. Faculty will use reflective self-assessment of their teaching to develop and refine teaching strategies and to assess the impact of those techniques on student learning.

**Actions to support these recommendations**

Faculty actions:

- ◆ stay abreast of research in mathematics and mathematics education
- ◆ engage in educational research to document the effectiveness of their instructional strategies
- ◆ communicate the results of this research broadly.

Departmental/institutional actions:

- ◆ encourage and support innovation in mathematics classrooms
- ◆ provide incentives for specialized training and to encourage innovation, classroom research, and the scholarship of teaching projects
- ◆ support faculty, both full-time and adjunct, in research projects and professional development activities through reassigned time or stipends.

**Improving Student Learning through Faculty Evaluation**

Faculty evaluation is the process of self-review, as well as the review of faculty work by supervisors, peers, and students. Faculty evaluation provides insight to improve instruction and grow professionally, in addition to being a basis for personnel decisions. A clear distinction should be made between assessment of student learning for the purposes of course or program improvement and the evaluation of faculty.

Different types of evaluation, such as peer evaluation, student evaluation, self-evaluation, and administrative evaluation, may contribute to a faculty evaluation process. Each type of evaluation is a valid tool for self-improvement in teaching and learning. Objective and subjective criteria should be included in the evaluation process. Informal discussion among and between peers should be encouraged to promote excellence in teaching. Students should have the opportunity to give feedback to faculty at multiple times throughout a course, with the expectation that faculty will use this information to improve student learning. An effective faculty evaluation system should include the following components:

**Evaluation can be a positive force when used to encourage community college faculty members to continue their professional growth and thereby improve the delivery of their professional services.**

University of Hawaii  
Community Colleges,  
*Procedures for  
Evaluation of Faculty,*  
April 1990

- ◆ significant faculty input is sought as the evaluation process is developed
- ◆ content and form of the evaluation process are mutually agreed upon by faculty and administration
- ◆ multiple tools for evaluation are available and used
- ◆ written documentation outlining the aspects and requirements of the evaluation are given to faculty prior to implementation of the evaluation system
- ◆ evaluations are conducted in similar ways for all faculty in the institution
- ◆ a description of the evaluation process to be used for faculty personnel decisions, such as promotion or tenure, is clearly communicated.

The periodic evaluation process for adjunct faculty should be as rigorous as that for full-time faculty. The tools for evaluation may have to be slightly modified for use with adjunct faculty based on the contractual agreement made with the adjunct faculty regarding teaching, conducting office hours, and assisting students.

**Implementation recommendation:** Faculty evaluation will be regular, systemic, and ongoing, based on criteria known to all faculty, with the goal of improving student learning in mathematics.

### Actions to support this recommendation

#### Faculty actions:

- ♦ engage in self-review and reflection to grow professionally and improve student learning
- ♦ develop and assess a personal professional development plan
- ♦ work together with administrators to develop the components and criteria of evaluation for full-time and adjunct faculty
- ♦ use the results of faculty evaluation to improve student learning in mathematics.

#### Departmental/institutional actions

- ♦ provide faculty with a description of the faculty evaluation process
- ♦ provide input from multiple sources in the faculty evaluation process.

## Conclusion

Faculty grow and improve professionally, implement change, and embark on informed instructional decision-making when all essential elements of a system are engaged and operating in concert. Faculty need to accept and take responsibility for continuing to learn about mathematics and effective mathematics instruction. Departments and institutions can foster faculty growth and change by providing financial support and the time faculty need to develop and implement effective strategies. Planning and implementing improvements can be facilitated by using the *Beyond Crossroads* Implementation Cycle. Administrators, rather than maintaining the status quo, can encourage reform and support efforts to enhance student learning.<sup>17</sup> Leadership and material resource management, policy, curriculum, instruction, and assessment must be aligned, with the goal of optimizing student and instructional outcomes.<sup>18</sup>



### HIGHLIGHTS Implementing the Standard for Professionalism

#### Professionalism

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

#### At a standards-based institution, the *faculty*

- ✓ view mathematical and pedagogical knowledge as dynamic, requiring lifelong learning.
- ✓ use research to make informed decisions about instructional practices.
- ✓ actively participate in professional development activities and service.
- ✓ document results of their classroom activities and innovations, and communicate the results broadly.
- ✓ engage in ongoing self-reflection of one's teaching.

#### At a standards-based institution, the *mathematics department and the institution*

- ✓ assure that mathematics faculty participate in the hiring process to find capable and qualified faculty.
- ✓ hold regularly scheduled department meetings to discuss the teaching and learning of mathematics.
- ✓ invite adjunct faculty to participate in department meetings and discussions.
- ✓ encourage and support faculty professional development.
- ✓ provide professional development activities for all faculty as a part of department meetings or at special faculty meetings.
- ✓ provide mentors to faculty who need them and provide orientation for new faculty.
- ✓ solicit faculty input in the design of effective faculty evaluation processes.

- 1 Strauss, G. (1963). Professionalism and Occupational Associations. *Industrial Relations: A Journal of Economy and Society*, 2(3), pp. 7–9.
- 2 AMATYC. (1992). *Guidelines for Academic Preparation of Mathematics Faculty Two-Year Colleges*.
- 3 Examples of current programs: Project ACCESS (Advancing Community College Careers: Education, Scholarship, and Service), jointly sponsored by AMATYC and the MAA and funded by the ExxonMobil Foundation, is a mentoring and professional development initiative for two-year college faculty [http://www.maa.org/Project ACCESS](http://www.maa.org/Project_ACCESS). The PMET (Preparing Mathematicians for Educating Teachers) initiative was designed to help mathematicians enhance the teaching of mathematics courses for future teachers, sponsored by the MAA. PREP (Professional Enhancement Program) is a comprehensive, professional career enhancement project of the MAA funded by NSF that offers a large number of workshops and short courses across the country <http://www.maa.org/prep>. Project NExT (New Experiences in Teaching), sponsored by the MAA and funded by the ExxonMobil Foundation, is a professional development program for new or recent Ph.D.s in the mathematical sciences (including pure and applied mathematics, statistics, operations research, and mathematics education) <http://archives.math.utk.edu/projnext>. The College Faculty Preparation Program (CFPP) is a discipline-specific program to better prepare graduate students interested in teaching careers at the community college or university level. Humboldt State University offers a graduate certificate in college teaching in the area of mathematics <http://humboldt.edu/~gradst/cfpp/Programs/ProgramsMathematics.html>.
- 4 To reach underrepresented minorities, such publications as the *Quarterly Newsletter* of the National Association of Mathematicians may be helpful <http://www.math.buffalo.edu/mad/NAM/index.html>.
- 5 Luna, G. & Cullen, D. L. (1995). *Empowering the Faculty: Mentoring Redirected and Renewed*. *ERIC Digest*, ERIC document ED399888.
- 6 Cook, S. G. Practical Tips for Effective Faculty Mentoring. Reprinted in the University of Wisconsin–Milwaukee Employee Newsletter, Vol. 1, No. 2, April 2004. Originally printed in *Women in Education*, December 2003.
- 7 AMATYC. (1989). Reaffirmed 2005. *Position Statement on Equal Opportunity in Mathematics*.
- 8 AMATYC. (1996). *Guidelines for Internships for Two-Year College Mathematics Faculty*.
- 9 AMATYC. (1998). *Position Statement on Support for Professional Development*.
- 10 American Mathematical Association of Two-Year Colleges (AMATYC). Cohen, D. (Ed.). (1995). *Crossroads in Mathematics: Standards for Introductory College Mathematics before Calculus*. Memphis, TN: American Mathematical Association of Two-Year Colleges.
- National Council of Teachers of Mathematics (NCTM). (2000). *Principles and Standards for School Mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- 11 Hutchings, P. & Shulman, L. S. (1999). The Scholarship of Teaching: New Elaborations, New Developments. *Change*, 31(5), p. 12.
- 12 In these classroom assessment techniques, students may be asked to summarize an important concept discussed in class in a one-minute paper or describe a concept that is still “muddy” or unclear at the end of class.
- 13 Angelo, T. & Cross K. P. (1993). *Classroom Assessment Techniques, A Handbook for College Teachers*, Second Edition. San Francisco, CA: Jossey-Bass.
- Angelo, T. Presentation at the AMATYC Annual Conference, Salt Lake City, UT, November, 2003.
- 14 Shulman, L. S. (1993). Teaching a Community Property: Putting an End to Pedagogical Solitude. *Change*, 25(6), pp. 6–7.
- 15 Hutchings, P. (Ed.) (2000). *Opening Lines: Approaches to the Scholarship of Teaching and Learning*. Stanford, CA: The Carnegie Foundation for the Advancement of Teaching.
- Hutchings, P. (Ed.) (1998). *The Course Portfolio: How Faculty Can Examine Their Teaching to Advance Practice and Improve Student Learning*. Washington, DC: American Association for Higher Education.
- 16 Examples: *The Journal of Scholarship of Teaching and Learning* (JoSoTL), a Web journal, serves as an electronic forum for sharing scholarly work, retrieved 4/12/2006 from [www.iusb.edu/~josotl/](http://www.iusb.edu/~josotl/). In 1998, The Carnegie Foundation for the Advancement of Teaching initiated CASTL: the Carnegie Academy for the Scholarship of Teaching and Learning. CASTL aims to foster significant, long-lasting learning for all students and to enhance the practice and profession of teaching: [www.carnegiefoundation.org/CASTL](http://www.carnegiefoundation.org/CASTL).
- 17 Sparks, D. (2002). Dreaming All That We Might Realize. *ENC Focus*, 9(1).
- 18 Long, M. J. (1997). Things to Consider When Implementing Reforms in the Mathematics Classroom. *Reform in Math and Science Education: Issues for Teachers*. Columbus, OH: Eisenhower National Clearinghouse.