

Connections



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"...there is a clear need for reflecting on the work we do related to doctoral programs and doctoral students."

AMTE's Role in Doctoral Programs in Mathematics Education

Karen Karp, University of Louisville
AMTE President

As AMTE moves forward there is a clear need for reflecting on the work we do related to doctoral programs and doctoral students. The focus of this article is on leadership our members have taken, the results of that leadership, and the momentum for new growth. There are three key areas to consider: 1) How can we create the best programs to prepare doctoral students for a career in mathematics teacher education? 2) How can we help potential doctoral students find the program that is best aligned with their goals? and 3) What are the ways that doctoral students and new faculty can be best supported as they enter our profession? Many of the recent presentations at our annual conference and new initiatives supported by the AMTE Board members respond to these questions.

Creating Outstanding Programs Starting from Scratch

At our recent conference, AMTE members **Mark Klespis** and **Jan Scott** presented a session on "Creating a Doctoral Program in Mathematics Education from Scratch." Mark and Jan described how they were asked by the Coordinating Board at Sam Houston State University to develop a doctoral program in mathematics education that would be housed in the mathematics department. This is an arrangement that would be unique in the state of Texas as most mathematics education doctoral programs are housed in education departments.

Because Sam Houston State University is a comprehensive, four-year university with few doctoral programs, and none in Arts and Sciences, Mark and Jan started developing the program without support from existing models. They began to develop a framework relying heavily on the AMTE monograph

Principles to Guide the Design and Implementation of Doctoral Programs in Mathematics Education, (an electronic version can be found under **Position Papers and Publications** at the AMTE web site) developed by a Task Force headed by **Robert Reys** as well as by the Robert Reys and **Jeremy Kilpatrick** MAA publication, *One Field, Many Paths: U. S. Doctoral Programs in Mathematics Education* (2001).

Initially two PhD tracks were proposed – one for students interested in elementary and middle school mathematics education, and a second for students focusing on high school mathematics education. Difficulty arose with mathematicians in the department who felt the mathematics content of the doctoral courses for the elementary and middle school students was not rigorous enough. After some weeks of intense discussion, the two distinct tracks were blended and the mathematics content courses modified to the satisfaction of all concerned. Mark and Jan did find that their colleagues were not, however, easily swayed by the MAA or AMTE recommendations – especially those related to K-8 preparation.

In response to their proposed program, the Coordinating Board at Sam Houston State University had three concerns: the current level of faculty research productivity, the amount of mathematics content required, and the projected number of doctoral students. Ironically, the Board thought the program had too many mathematics content classes and too few mathematics education courses.

During Mark and Jan's session, one participant, Albert Otto of Illinois State, raised a question that was never asked by

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**The Association of
Mathematics Teacher Educators**

President

Karen Karp
Department of Teaching and Learning
College of Education and Human Development
University of Louisville
502-852-1654
karen@louisville.edu

President -Elect

Sid Rachlin
Dept. of Mathematics & Science Education
East Carolina University
252-328-1899
rachlins@mail.ecu.edu

Secretary

Jennifer Bay-Williams
Department of Elementary Education
Kansas State University
785-532-5808
jbay@ksu.edu

Treasurer

Mark Klespis
Mathematics Department
Sam Houston University
936-294-1577
mth_mlk@shsu.edu

NCTM Representative

Janet Caldwell
Mathematics Department
Rowan University
856-256-4500 x 3871
caldwell@rowan.edu

Board Members at Large

Peg Smith
Department of Instruction and Learning
University of Pittsburgh
pegs@pitt.edu

Susan Friel
Department of Curriculum and Instruction
University of North Carolina – Chapel Hill
sfriel@email.unc.edu

W. Gary Martin
Department of Curriculum and Teaching
Auburn University
martiwg@auburn.edu

Executive Director

Nadine Bezuk
San Diego State University
6475 Alvarado Road, Suite 206
San Diego, CA 92120
(619) 594-3971
nbezuk@mail.sdsu.edu

Comments, questions, and suggestions for
AMTE Connections should be directed to the
editor:

P. Mark Taylor
Theory & Practice in Teacher Education
University of Tennessee, Knoxville
pmark@utk.edu
(865) 974-0448

AMTE Business

Elections Results

President-Elect: Sid Rachlin
Treasurer: Mark L. Klespis
Board Member-at-Large: W. Gary Martin

Task Forces and Committee Changes

The members of the AMTE Board recently approved three new task forces. The first will be a Doctoral Programs Task Force led by Bob Reys. As a result of his presentation at AMTE (on rating and ranking doctoral programs - which people decided was not wise) the group discussed creating a data bank on the various doctoral programs that would assist potential doctoral students on making decision amongst the choices available. This information would be housed on our web site and would be a major national resource.

The second is the Teaching Resources Task Force led by Susan Friel and Peg Smith. This group would work on the Case Studies resources and link to possible ways these resources (and others) can be used in our teaching.

The third is a Mentoring Task Force, for which the leader has not yet been appointed. This group will seek ways to work with new faculty/doctoral students (similar to project NExT model in some ways) possibly linking a new AMTE member with a mentor.

Please contact Karen Karp if you are interested in participating in any of these task forces.

Increase Approved by AMTE Members

At the January meeting, the members of the AMTE voted for the increase in dues as recommended by the Board of Directors. The vote increases membership dues to \$45.00 for regular members (a \$10 increase) and \$22.50 for student members (a \$5 increase). This proposed will go into effect following the conference. Membership dues were first set at \$10 in 1993, increased to \$20 in 1997, and increased to \$35 in 2000.

Texas Instruments Offers Special Deal for AMTE Members

Watch your mailbox over the next few weeks as TI is offering large discounts on products of special interest to mathematics teachers educators!

Call for Proposals - NOW ONLINE!

Association of Mathematics Teacher Educators (AMTE)

Ninth Annual Conference - January 27-29, 2005

Dallas Marriott Las Colinas Hotel Dallas, TX

Recommended Formats for Presentations

The AMTE Board of Directors believes that the AMTE Annual Conference should provide participants with an opportunity to examine and discuss current issues in mathematics teacher education and professional development and share related ideas and information. Therefore, all sessions must provide opportunities for all participants to be actively engaged. The details on how you will involve participants in your session must be included in your proposal.

Format One: Thematic Presentation (60 minutes). Thematic presentations are designed to include either one substantive presentation or a panel discussion. With one main presentation, there should be two prepared critiques or responses. Panel discussions should formulate the salient points related to an issue of current concern to mathematics teacher educators with a moderator to foster interaction among the panelists. A total of at least 20 minutes must be allocated for participant interaction.

Format Two: Symposium or Working Group (60 or 90 minutes). Symposia include several presentations focusing on the same issue from different perspectives or related aspects with a minimum of 30 minutes allocated for participant interaction. Working group sessions are designed to permit significant interaction among session organizers and participants on a particular topic of interest to AMTE members. Indicate the preferred time length for the session with a brief outline of how the time will be used. Note, however, that the program committee reserves the right to adjust session lengths to fit the confines of the program.

Format Three: Mini-Sessions (15 minutes — repeated three times). Presenters are responsible for displaying a poster and distributing handouts detailing project overviews and updates, local and state initiatives, new courses or programs recently developed, or brief research reports of interest to mathematics teacher educators. Each mini-session will be presented in a room with 6-8 posters. During a 60-minute period, participants will have an opportunity to join in three mini-sessions.

Note that a **Computer Room** will be available for sessions that wish to include interactive activities. (However, you cannot count on having a live internet connection for all computers.) Please indicate your interest in presenting in the Computer Room under *Equipment Needs* on the *Proposal Form*, and describe how it would be utilized in your *Abstract*.

Proposals must be submitted electronically by Tuesday, June 1, 2004.

All proposals will be submitted online. The registration link will soon be available on the AMTE website (<http://www.amte.net>) on or before March 15.

Please note that the entire *Call for Proposals* is available on the AMTE website:

www.amte.net

“With your conference registration, you can renew your membership in AMTE .”

Regardless of their level of experience, I have found it inspiring and invigorating to exchange ideas with professionals who share mathematics education as an interest.

Reflection on the 2004 AMTE Conference: Mika Munakata, Montclair State University AMTE-Sponsored Project NExT Fellow

As a newly inducted assistant professor, my life has changed somewhat in the past year and a half. Not too long ago, I was knocking on my advisor's door, asking for guidance on my dissertation. Now, students are knocking on my door, hoping to receive guidance from me. Not too long ago, I was combing through textbooks, trying to predict items that would appear on exams. Now, I am creating those exams. Not too long ago, I was scouring the stacks at the library, trying to locate references, then scrounging for dimes to feed into the copy machine. Now...well, some things haven't changed.

Many factors have aided me in my transition from graduate student to assistant professor. They include helpful colleagues and administrators, hard-working students, and interesting classes to teach. While this support system has helped me at the local level, I have also been exposed to innovative ideas in teaching and reports of recent research efforts from my colleagues at the national level. As the AMTE Project NExT (New Experiences in Teaching) Fellow for 2003-2004, I have had the opportunity to attend national meetings where I have met fellow 'Fellows', all of whom are in their first two years of teaching at the collegiate level, and more experienced mathematics educators, who have shared their insights. Regardless of their level of experience, I have found it inspiring and invigorating to exchange ideas with professionals who share mathematics education as an interest.

The Eighth Annual Conference in San Diego was my first AMTE conference. My experience at AMTE was unique from previous national conferences because of AMTE's specific focus. While I usually become over-

whelmed by the sheer volume and range of topics at other meetings, the program at AMTE offered a focused program with presentations that were directly relevant to my professional interests. I often found myself in a quandary, enticed by the many interesting titles, wondering which of the concurrent sessions I should attend. My colleague, Ken Wolff, and I strategically planned out our days so that we were never in the same room at the same time; we wanted to cover all possible bases.

From an overview of a calculus course for practicing elementary and middle school teachers to demonstrations of video case studies used to encourage inclusive participation, the sessions offered insights into innovative practices in the training of mathematics teachers. The sessions were guided by issues central to mathematics education such as results of recent research, responses to assessment standards, and the pedagogical experiences of the presenters. I was often scribbling furiously during the sessions, trying to take notes on the presentations, for later ingestion and implementation.

In addition to the ideas I gathered about teacher education courses and programs, the benefit of the conference for me was meeting fellow mathematics educators. I was able to put faces to names I'd only heard previously (and cited, in many cases), and was also able to catch up with friends from graduate school. From attending this conference and participating in the Project NExT program, I have come to realize the value of being a part of a professional and intellectual community. The focused mission of the AMTE conference was both inspirational and motivating to me. ■

News from NCTM: PSSM Available to Non-members

In response to AMTE members and others' concerns, the NCTM Board of Directors has reviewed its decision to move the online version of Principles and Standards for School Mathematics (PSSM) to the member benefit section of the NCTM Web site. Based upon your input and the input of others, the Board has modified its decision. Non-NCTM members will be able to register for a 90-day, free access to the online version of PSSM. This new service will be available March 1, 2004

and thereafter.

In order to ensure that NCTM is in the position to continue its efforts to improve mathematics education, NCTM asks you to encourage your colleagues and students to become members of the Council. The benefits and services of membership will provide them with a wealth of professional resources, and a larger membership base will aid in efforts to make a positive impact on public policy. ■

“Calling Out” the Stalkers of Mathematics Education

Johnny W. Lott, NCTM President

When the word *stalker* is used, different images come to mind: a hunter, a shadower, or possibly a person who follows another person with the intent to harm. In recent years, a kind of stalking, lurking menace has focused on the field of mathematics education. It is time to confront this presence and “call it out” for what it is.

This menace to mathematics education has appeared in three guises: the expert who uses position or power in an attempt to denigrate the field; people who use half-truths, fear, and innuendo to try to control public opinion, school boards, and other agencies that work with mathematics education; and, finally, federal agencies that use money to bend state and local school systems to their will.

Consider the expert who uses position or power to denigrate the field. This person works in devious ways, such as becoming a “friendly” critic of journal articles and publications. Because journals like NCTM’s *Mathematics Teacher* strive to publish content that is mathematically accurate, it behooves the journal to pay attention to any critic who challenges either the mathematics or the language of an article. Editors typically respond to such criticism by publishing a letter that corrects the mathematics (if needed) or by acknowledging that the critic’s opinion differs from the author’s. Over time it has become clear that some critics use their stature as experts to attack any thinking that disagrees with their own and even challenge the Council’s academic integrity with threats to get their way. One such expert recently wrote, “If you do not acknowledge and correct this article as I have suggested, then I will spread the word that this journal lacks all credibility in the field.” The journal has been stalked. Outside the academic world, threats of this nature might be met with legal action.

Within the academic world, however, this is not done. But the journal must defend itself against such positions or else be publicly slandered. Regardless of whether the journal acknowledges this “expert’s” position, it may continue to be harassed and maligned. We must stop this academic stalking while still allowing legitimate criticism.

Consider people who use half-truths, fear, and innuendo to control public opinion about mathematics education. As an example, look at Web sites that continue to use a public letter written in 1999 to then Secretary of Education Richard Riley by a group of mathematicians and scientists defaming reform mathematics curricula developed with National Science Foundation

grants. Even though some of those who signed the letter subsequently retracted their statements or wrote letters stating that they did not sign the letter thinking it would be used as it has been, the letter seems to surface any time there is controversy over school curricula. A small group continues to use the letter in an attempt to thwart changes to mathematics curricula. This has been done in California, Massachusetts, and most recently New York. This letter is not the only example of half-truths and innuendo being used against mathematics curricula, even though continuing research shows that such curricula do in fact work when used by knowledgeable teachers. All of us must work to stop this stalking of reform mathematics curriculum.

Finally, consider federal agencies that use money to coerce state agencies and school systems to implement facets of the No Child Left Behind Act (NCLB). Although NCTM applauds and commends the intent to give every child access to mathematics taught by a highly qualified teacher, the manner of implementation of this law raises some concerns. States that do not yield to NCLB’s underfunded mandate for external tests, do not define highly qualified teachers in a manner deemed acceptable, and do not provide a system to allow parental control of the schools that children attend may sacrifice any rights to specific federal funds. Although the Council acknowledges the need for changes that will close the achievement gap and offer a better mathematics education especially for children of poverty, it cannot condone the manipulation of schools with the possible loss of funding, the acceptance of people to teach with minimal qualifications through alternative certification, and mandates to change curricular standards to meet the expectations of some leaders in the federal government.

We can put a stop to the stalking and coercion of mathematics education by individuals, groups, and governments only by speaking out knowledgeably and by taking a united stand for mathematics education that serves students. That standards and curricula enhanced by the 1989 and 2000 publishing of the NCTM *Standards* documents have improved mathematics education is evident in the improved student scores on the SAT and NAEP. Regardless of what critics may say, we have evidence of what is working. Let us stand together and not allow the progress in the past 15 years to be set aside by a lurking menace looking to denigrate these accomplishments. ■

In recent years, a kind of stalking, lurking menace has focused on the field of mathematics education.

“Stalkers,” reprinted with permission, was originally published in the January/February 2004 issue of the *NCTM News Bulletin*.

Doctoral Programs

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their math colleagues – would a K-8 person graduating from the proposed program be able to teach a mathematics methods course in a Curriculum and Instruction department? Mark and Jan believe they would, and noted that necessary competencies would be addressed in mathematics education courses and in courses focused on pedagogy in the College of Education. Not surprisingly, their mathematics department expressed greater concern about a potential graduate's ability to teach a mathematics content course.

Collaborative Doctoral Programs

The National Science Foundation invested in several Centers for Learning and Teaching in an effort to provide a renewed force of leaders in mathematics and science education. Many Centers with particularly distinctive and well thought out doctoral programs are headed by members of AMTE. These Centers are already attracting large numbers of interested applicants. The following is a brief look at what several centers are doing to prepare doctoral students in mathematics teacher education.

AMTE member **Barbara Reys** provided an update on the work of *The Center for the Study of Mathematics Curriculum (CSMC)* housed at Michigan State University, University of Missouri-Columbia, and Western Michigan University. A doctoral program in the center focuses on the improvement of student knowledge in mathematics education, which helps to develop students' expertise in conceptualizing, conducting and reporting research in the field, particularly regarding curriculum.

A unique contribution of the Center is the development and dissemination of a series of graduate level mathematics curriculum courses that will serve as an area of study emphasis. These doctoral courses will enable doctoral students to understand the historical evolution of mathematics curriculum, study curriculum design principles, review curriculum research, and develop expertise in designing and carrying out studies to investigate the impact of curriculum materials. As other programs look for strong courses to emulate, these courses appear to provide new ways to help students grapple with the curricular issues in mathematics education. For more information on the CSMC doctoral program go to: <http://mathcurriculumcenter.org>

Another center with a strong doctoral

component, *CLT-West*, is a consortium of five universities collaborating with tribal colleges and public schools in Montana, Colorado, and Oregon. This Center focuses on understanding and improving student learning and achievement in science and mathematics, for high-needs populations in urban and rural settings.

AMTE member **Libby Krussels** reports that CLT-West has both mathematics and science education doctoral students. The unique characteristic of their doctoral program is the development of a cohesive collection of on-line courses for the doctoral students. Since the distance among the partner institutions is great, leaders had to come up with a creative solution to provide for all doctoral students without replicating the program at all five sites. There are doctoral fellows on all campuses - Montana State University, Portland State University, Colorado State University and The University of Montana - as well as "distance" fellows who have begun their on-line course work but have not yet attended a campus full time. Students currently take courses in Diversity and Equity, Professional Development, Cognition and Instruction, Assessment and Evaluation, and Public Policy. These courses all have an emphasis on identifying ways to reduce the achievement gap in mathematics and science in middle and high school. These doctoral courses can inform other AMTE members about successful approaches for preparing doctoral students for their own pre-service and in-service teachers as well as the children they will eventually teach in the schools. For further information explore the CLT-West website at: <http://www.chem.pdx.edu/~wamserc/NSFCLT/>

The *Mid-Atlantic Center for Mathematics Teaching and Learning* was established in September, 2000, as a collaboration among the University of Delaware, the University of Maryland, The Pennsylvania State University and three public school systems. AMTE member **Jim Fey** reports that the central work of their doctoral program is to design and operate an innovative program of doctoral and postdoctoral education for specialists in mathematics teacher education, curriculum development, policy leadership, and mathematics education research.

Their doctoral students are enrolled in courses addressing major knowledge domains of mathematics education, while they work on research projects to develop and study new models for teacher preparation and profes-

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“Many centers with particularly distinctive and well thought out doctoral programs are headed by members of AMTE.”

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sional development. The Center leaders believe the “combination of coursework and experiences in professional development, teacher preparation, and research gives them theoretical and practical preparation for future work on the common tasks of doctoral specialists in the field.” The Center’s work has focused on tasks such as the development of a broad conceptual framework of knowledge, skills, and dispositions required by national leaders of mathematics education and the creation and testing of courses in mathematics and mathematics education to provide the knowledge base for future professional leaders.

The exciting program of the Mid-Atlantic Center has already brought together a diverse pool of 35 doctoral students to the three universities comprising the Center partnership. The first cohort is currently completing the third year of their doctoral studies. Jim Fey reports that he and others on the Center team will present more details about this work in doctoral education and lead a working discussion of the issues in a presentation at the SIG-RME research pre-session prior to the Philadelphia Annual NCTM meeting in April, 2004. Please join them for further information about this important work.

ACCLAIM, another National Science Foundation Center for Learning and Teaching, is attempting to build the capacity and expertise in the region that encompasses and surrounds the Appalachian Mountains of Kentucky, Ohio, West Virginia and Tennessee. AMTE members **Bill Bush** and **Vena Long** report, surprising to some, that this region has 93 institutions of higher education involved in teacher preparation. The doctoral program seeks students mainly from central Appalachia and provides them with an opportunity to pursue a doctoral degree emphasizing teaching and learning of mathematics in rural settings without requiring them to leave work and family for long periods. Ohio University, University of Kentucky, University of Louisville, West Virginia University, and University of Tennessee are cooperating to offer this degree.

This program is unique in that it comprises three years of extensive coursework in mathematics, mathematics education, rural sociology, and research methodologies. During the first three years, doctoral students attend a summer program on a university campus and complete the rest of the coursework via distance education courses. Students receive ongoing support from university faculty and mentors from their

geographic area.

The first cohort of doctoral students was accepted in 2002 and 11 of the 12 students attended the recent AMTE conference in San Diego. AMTE members **Karen Mitchell** and **Tom Klein** are attempting to create an AMTE affiliate group that will include doctoral students and mathematics teacher educators in the region. The second cohort of 20 will begin this summer with their initial coursework. For further details refer to the ACCLAIM website at <http://www.acclaim-math.org/>

Finding the Right Doctoral Program

Robert Reys of the University of Missouri researched doctoral degrees in mathematics education and found that in 1990 there were 65 doctorates awarded with a major area identified as mathematics education from 31 different institutions. In 2000 there were 90 doctorates from 51 institutions. From 1998 to 2002 (5 years) there has been a total of 474 doctorates with a major area identified as mathematics education from 111 institutions. This large number demonstrates that there is a growing number of institutions providing a variety of experiences for future mathematics teacher educators. In response, Robert Reys’ presentation at the AMTE conference with Jeremy Kilpatrick explored “Ranking Doctoral Programs in Mathematics Education: A Worthwhile or Worthless Enterprise.” The resulting discussion moved away from the idea of a ranking or rating system to the expressed need for a means to provide potential doctoral students with detailed information on a variety of criteria for the multiple programs available. In response, AMTE is appointing a Task Force led by Robert Reys that will decide on appropriate criteria, gather information about extant programs and put together a database that will be reached through the AMTE web page. In this way, applicants looking for a doctoral program can make judgments as to which program most closely matches their needs and professional goals.

Starting Out – Helping Doctoral Students and New Faculty Members

In an effort to help new or recent Ed.D.s and Ph.D.s in mathematics teacher education, AMTE is establishing a Task Force on Mentoring. We all recognize the challenges of beginning an academic career: providing outstanding teaching to future teachers, engaging in scholarly inquiry and dissemination, and providing

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AMTE Conference 2004



Doctoral Programs

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service to local and national organizations. A frequently mentioned benefit of AMTE is our encouragement of networking, so it is logical that we find a more formal way to provide new members with a network of peers and mentors as they embark on a career. By identifying ways to support doctoral students and recent graduates who are just starting in the field, we provide a jump start into a set of resources and survival models that many of us came to only later in our professional lives. Although MAA's idea of Project NExT fellows (which includes two supported by AMTE: Tim Hendrix and Mika Munakata), is a funded program – the AMTE version would be a more "home-grown" support system. The Task Force might find opportunities to link new members to long-standing members so they

would strive to share resources, introduce each other to colleagues, and help new members establish a balance among the many responsibilities of mathematics teacher educators in research, teaching and service.

As AMTE seeks to answer questions regarding outstanding doctoral programs, ways for prospective doctoral students to locate institutions that respond to their needs, and support systems for doctoral students and recent graduates, your role in the process is welcome.

If you would like to be a part of any aspect of this work, please respond to the AMTE Volunteer Form that was sent over email to you and is available on our website. You may also consider responding to the Call for Proposals for the 2005 conference in Dallas with information about your successful doctoral program and students. ■

Report on the Eighth Annual AMTE Conference

The Eighth Annual AMTE Conference was held January 23-24, 2004 in San Diego, CA. The conference saw record attendance and enthusiastic participation. The conference actually began before it began, with a number of presessions the morning and afternoon of Thursday, January 22, including the AMTE Technology Preconference Workshop featuring Multimedia Case Studies.

The preconference festivities continued Thursday evening with a symposium presented by Cathy Seeley, incoming president for the National Council of Teachers of Mathematics. In a well-received session, she addressed the "Home Depot model" for leadership development—You/They Can Do It, We/You Can Help. 134 people attended the symposium and dinner which followed.

Over 350 people attended the regular conference on Friday and Saturday, which included 99 breakout sessions in a variety of formats and lengths, from 30 to 90 minutes. Topics addressed included preservice and inservice mathematics teacher education, considering teachers from elementary to secondary levels, changing teachers' content knowledge as well as pedagogical knowledge, informal reports of successful methods and projects as well as more formal research reports, a range of technology applications, developing successful

teacher education programs, building partnerships with mathematicians, and much, much more.

One of the highlights of the conference was the Judith E. Jacobs Lecture, presented Friday evening by Tom Cooney, a long-time practitioner and researcher in mathematics teacher education and founding editor of the *Journal of Mathematics Teacher Education*. The topic of his address was "The Role of Teacher Education: Reform or Enculturation?" Through a tour de force review of research in mathematics teacher education, combined with historical and philosophical perspectives and a healthy dose of humor, he inspired and challenged the audience to reflect on the nature and goals of our profession.

The conference concluded Saturday afternoon with a well-attended closing session, which included a presentation on the MathematicallySane.com website and a lively business meeting conducted by our president, Karen Karp. No one went away empty-handed—the vendors displaying at the conference generously donated materials and books for door prizes.

If you attended the conference, you no doubt left with much to think about in considering how you can become a more effective mathematics teacher educator. For those who did not make the meeting, there's always next year! Mark your calendar now for the 2005 Annual Conference in Dallas, Texas to be held January 27-29, 2005. ■



THEORY & PRACTICE: Framework for Mathematics Methods Courses

P. Mark Taylor, University of Tennessee

At the 2004 AMTE Annual meeting, there was a session devoted to a discussion of methods courses. Participants shared their teaching strategies, major assignments, and assessment schemes. A recurring theme was that of getting the preservice teachers to see themselves at the beginning of a professional development continuum that would last their whole career. Examples of the kinds of activities include participation in professional organizations, constant reflection on practice, and active building of one's own professional network (a.k.a. collecting colleagues). In the responses to the Theory & Practice question from the October 2003 issue of *AMTE Connections*, this theme of ongoing professional growth is also evident. Responses for secondary, middle school, and elementary methods courses are offered here for your reflection and professional growth.

Theory and Practice Question: How would you describe the current framework for your mathematics methods course? What are the main goals and how are they achieved?

Secondary Methods: Daniel J. Brahier, Bowling Green State University

I have designed my secondary methods course to address three major areas: curriculum, teaching, and assessment. In the area of curriculum, I believe it is important for students to wrestle with the idea of what it means to teach and learn mathematics, as well as how students learn. In this portion of the course, we explore the National, State, and Local models for curriculum, including *Principles and Standards for School Mathematics* (2000) from NCTM. We also look at the role of research in mathematics education and the importance of teachers adopting classroom teaching strategies that are consistent with this research (i.e., best practices). We also explore how goals and objectives are written and classified and how they are used as the basis for instruction. Particularly in the case of secondary students, I find that this part of the course is extremely important. For most of them, mathematics has always come easily, and they live with the myth that learning will be as easy for their students as for them, regardless of their teaching methods. Unfortunately, most

of these students learned by very traditional means, so they assume that "if it worked for me, it will work for my students too." Presentations of recent research – such as TIMSS and NAEP data – help me to build the case that their students may not achieve success with use of these methods.

With this background, we begin to look at the art of teaching. In the second major portion of the course, we examine models for writing lesson plans and the use of teaching strategies in those plans that will enhance learning for all students. We discuss the role of textbooks as "guides," rather than the "be all, end all." This gives me an opportunity to assign a project in which students review several of the NSF-funded curricula so that students will be aware of them and can use them as resources or work toward the adoption of these materials in their schools. We discuss the use of cooperative learning, questioning techniques, and the role of technology. Fortunately, we have another technology course that students take, so they get exposure to computer software and other tools in that course.

In the latter part of the secondary methods experience, we begin to discuss the issue of "how do you know if your students learned what you intended them to learn?" This, of course, launches a unit on assessment. We examine assessment strategies, from the basic details on how to write a test and check homework assignments, to the use of authentic assessments. We look at the role of journals, free-response questions, projects, observations, and so forth, helping students to recognize the value of capturing more diverse data than test results can reflect. My students are required to conduct an assessment project in the field, in which they "get their feet wet" with one of these non-traditional assessment techniques.

One final component that I believe is essential to any methods experience is looking at the role of ongoing professional development and the notion that becoming a better teacher is a lifelong process. Near the end of my secondary methods course, we explore the supervision and assessment of teaching, examining tools such as Praxis, INTASC, and the *Professional Standards for Teaching Mathematics* (1991). I actually spell out for them a number

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"Presentations of recent research – such as TIMSS and NAEP data – help me to build the case that their students may not achieve success with use of these methods."

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of resources that they have available to keep them active in their professional development process, such as the roles of NCTM, State and Local Councils, journals, Web resources, mentoring programs, visiting other classrooms, and the like. It is my hope that the students will leave my class with enough basic knowledge of the profession to ensure success in their first few years of teaching, while also being equipped with the tools necessary to continue the process of developing their skills and competencies throughout their careers.

**Middle School Methods: Diana Steele,
Northern Illinois University**

The central framework for my middle school mathematics methods course is to help preservice teachers begin an inquiry-oriented approach to teaching and learning mathematics that will enable them to continue to inquire and learn as part of their work as teachers. In my course we begin by investigating both *what* to teach and *how* to teach mathematics. I ask students to revisit and reexamine their past experiences as learners of mathematics to help them learn to think of the mathematics they will teach from the vantage point of the child who is learning. We explore teaching mathematics through investigating how middle school students learn mathematics in the areas of whole numbers, fractions, decimals, and geometry. Through these investigations I want my students to become proficient in ways to represent their own understandings of mathematical concepts, to build connections and relationships among mathematics ideas, and to communicate their reasoning about mathematical ideas by constructing mathematical arguments. In turn, I want my students to learn how to help their students in each of these core individual components of learning.

My assignments across the semester are intended to further preservice teachers' understandings of mathematics and what it means to teach and learn mathematics in light of the current reforms in mathematics education. The most valuable assignment that I give to my students is a student assessment interview. Because I believe their most important role as teachers is to assess their students' knowledge and build instruction based on this assessment, I ask my students to conduct an individual interview of a middle school student that will assess conceptual and procedural knowledge. My students develop the assessment questions on a particular topic (with my help) and give

this protocol to me for feedback. They then conduct and audiotape the assessment interview, write a report on the interview following the guidelines I have given them, and suggest an instructional plan for the student based on the information gathered during the interview. In the report they must describe the student's responses to assessment questions, evaluate the student's mathematical knowledge, conceptualize an appropriate lesson for the student, and reflect on the interview process.

For the third part of the assignment, my students must plan and teach a lesson based on what they learned from the student assessment. They must organize a coherent sequence of tasks that will integrate problem solving, concepts, and skills, and identify key questions to ask the student during the lesson. For the final part of the assignment, my students must write a report of their lesson in which they must describe what they learned about the student's mathematical thinking during the lesson and give specific examples to support their statements. In addition, they must evaluate the lesson, describe strengths and weaknesses of the lesson, and suggest any modifications they would make if they taught the lesson again. I have found that this cohesive three-part assignment is the most powerful teaching tool I have used to initiate the conceptual change the preservice teachers need to begin to teach in the spirit of the reforms in mathematics education and to encourage the reflection that will potentially impact their ongoing teaching practices.

**Elementary Methods: Ok-Kyeong Kim,
Western Michigan University**

My methods course can be characterized as providing pre-service teachers with opportunities to build an appropriate philosophy of teaching mathematics, relate theories with practices, and build a professional community. My methods course intends pre-service teachers to develop their own philosophy of teaching mathematics. Throughout the course, they read various articles and book chapters, watch video clips of actual classrooms, look at different curriculum materials, read classroom cases, and discuss various issues regarding teaching mathematics. Hearing, comparing, and analyzing all different opinions and perspectives from these sources, they build a solid foundation on which their ways of teaching mathematics will be grounded. In this way, they come to see a big picture of teaching mathematics and to be able to communicate their pedagogy with principals, parents, and colleagues.

“The most valuable assignment that I give to my students is a student assessment interview.”

THEORY & PRACTICE question for the next issue of *AMTE Connections*:
Integration of Mathematics and Science

How do you prepare teachers to make connections between mathematics and science? To what extent is this embedded in your courses for preservice teachers?

AMTE members are urged to respond to this question. Responses will be summarized and/or quoted. You may submit your response to pmark@utk.edu. Responses submitted by April 1 will be considered for inclusion.

(Continued from page 10)

Teachers' learning is not likely to carry over to their classrooms if they do not see the connection between what they learned in college and what they confront daily in the classroom. Pre-service teachers should have experiences that enable them to relate theories of learning and teaching that they learn in college with classroom practices that they will engage in. To do so, they need to have opportunities to develop an understanding of the content that they will teach and the ability to reason for themselves. Without appropriate knowledge and experiences to realize the value and the nature of mathematical understanding and reasoning, it is not likely that their learning to teach will impact their ways of teaching for students' understanding. Therefore, in my methods course mathematics is not only the

context in which pre-service teachers talk about how to teach, but also content that they need to learn more. Through the exploration of the mathematics that they will teach, they learn more about children's reasoning, strategies, and struggles. This experience also helps them think about specific teaching strategies, such as what question to ask and what decision to make in a certain situation. In addition, in order to implement what they learn and value in their classroom, they need to have opportunities to see and learn how that can be realized in the classroom through their own study of actual classroom examples

such as classroom videotapes, student work examples, classroom stories, teacher reflections, and activities from curricula.

Often, it is said that teachers are isolated from other teachers and they need collegial efforts to improve teaching. Building a professional community not only provides a context for learning, but also is a process of learning. In such a community, pre-service teachers have opportunities to share ideas, identify teaching problems, discuss important issues, and explore possible ways to solve teaching problems. They finally build their own base knowledge to teach mathematics on each other's ideas. In that community, everyone respects others and supports each other's learning. Based on this experience, they could continue to build a professional community for better mathematics teaching in the future. ■

“Through the exploration of the mathematics that they will teach, they learn more about children's reasoning, strategies, and struggles.”

AMTE Events at the NCSM & NCTM Annual Conferences in Philadelphia

AMTE Special Interest Meeting at NCSM

Wednesday, April 21, 2004, 2:15-3:15 pm, in Room 202B of the Convention Center.
All members and interested persons are invited to attend.

AMTE-sponsored Panel Discussion at NCSM

“Considerations and Questions for the Professional Development of Future and Current Mathematics Teachers”

Wednesday, April 21, 2004, 11:15 am - 12:05 pm, in Room 109B of the Convention Center.

AMTE Reception and Meeting at NCTM

Thursday, April 22, 2004, 6:30-8:00 p.m., in the Howe Room at the Loews Hotel.
All members and interested persons are invited to attend.

**For information on membership and other AMTE activities,
please visit the AMTE web site at
www.amte.net.**

AMTE - Dates to Remember

On-line at
amte.net

Membership/
Renewal Forms

Call for
Manuscripts

Position Papers

Conference
Information

Other
Opportunities

2004

April 19-21	NCSM Annual Conference - Philadelphia
April 19-21	NCTM Research Presession - Philadelphia
April 21-24	NCTM Annual Conference - Philadelphia
July 4-11	ICME-10 - Copenhagen, Denmark
October 14-16	NCTM Regional - Baltimore
November 4-6	NCTM Regional - New Orleans
November 11-13	NCTM Regional - Minneapolis

2005

January 5-8	MAA-AMS Joint Meeting - Atlanta
January 27-29	9 th Annual AMTE Conference - Dallas
April 4-6	NCSM Annual Conference - Anaheim
April 4-6	NCTM Research Presession - Anaheim
April 6-9	NCTM Annual Conference - Anaheim

Association of Mathematics Teacher Educators
Mark Klespis – AMTE Treasurer
Sam Houston State University
Mathematics Department
PO Box 2206
Huntsville, TX 77341-2206

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Reminder: The date on the label indicates the month that your membership is due to expire!