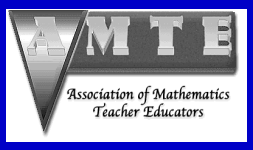
Volume 14, Issue 1—October 2004

Connections



Preparing Mathematics Teachers to Use Technology

Karen Karp, University of Louisville
AMTE President

Inside this issue:

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Importance of Teaching with Technology

Teaching with technology, either handheld or computer-based, holds great potential for transforming K-16 learning. Paraphrasing NCTM's oft-cited statement, some content becomes more important because technology requires it, some content becomes less important because technology replaces it, and some content becomes possible because technology allows it. New teachers who emerge from teacher education programs are expected to be able to effectively infuse technology in their classrooms, particularly computer-based technologies. Although K-12 schools are making substantial progress in increasing the numbers of computers in classrooms, the literature suggests that relatively few teachers are regularly using computer-based technology for instructional purposes other than word processing.

A goal at institutions of higher education is to help prospective and inservice teachers experience the benefits of learning with technology as they learn about ways to incorporate it into their teaching. As is often the case, as technology is recognized as a desirable skill by school districts, many states as well as accreditation bodies (e.g., NCATE and TEAC) stimulate change by mandating technological proficiencies through meeting state technology standards or adherence to the International Society for Technology in Education (ISTE) national standards (www.cnets.iste.org/ncate/#standards). As a result, educators involved with the preparation of teachers in all disciplines are being asked to alter their own teaching to include teaching with technology. Many college/university teacher education programs are moving away from a stand-alone technology literacy course to a well-articulated and coordinated infusion of technology skills across an entire program. Teacher educators are challenged to teach and reinforce technology-based skills while demonstrating how the pre-service or inservice teachers can appropriately blend these ideas across the full extent of the curriculum. There is an expectation that technology should be modeled by professors and embedded throughout the curriculum by using sophisticated technologies linked to higher level thinking rather than lower level reinforcement activities often associated with computer assisted instruction. In addition, as a result of the NCLB mandate and increased accountability, teacher education programs are asked to link the performance of their teacher candidates and graduates to the achievement of the K-12 students they teach.

Although limited access to technology is a frequently cited barrier, inadequate preparation to infuse technology is often named by teachers as a problem. The digital divide between resource-rich districts and those that are resource-poor is widening instead of closing, with most schools able to offer students only limited access to computers. Many classrooms only have one or two computers for students to share, making Internet access limited to a few learners.

(Continued on page 10)

Highlights of the Upcoming AMTE Conference

Seek first to understand, then to be understood. This admonition from Stephen Covey serves as the theme for our meeting in Dallas. Not since the "*Who shot JR?"* episode (ask one of the senior faculty) has there been so much excitement and anticipation about an event in *Dallas*. Beginning with the pre-conference workshops and the dinner symposium on Thursday and continuing through the closing session Saturday, the Dallas Conference will provide each of us an opportunity to understand and be understood. Unlike the many conferences you may participate in, where your attentions are drawn by the variety of hats you wear as a mathematics teacher educator, the AMTE annual provides an opportunity for you to focus on your craft, to examine and discuss current issues in mathematics teacher education and professional development and share related ideas and information.

From the 178 presentation proposals, the Program Committee (Fran Arbaugh, University of Missouri; Gladis Kersaint, University of South Florida; Doug Owens, Ohio State University; Sandi Cooper, Texas Tech University; Betz Frederick, Grand Canyon University; Elaine Hutchinson, University of Wisconsin at Stevens Point; Hank Kepner, University of Wisconsin at Milwaukee; Kathleen Lynch, Appalachian State University; Gary Martin, Auburn University; Connie Schrock, Emporia State University; and co-chairs Ralph Connelly, Brock University, and Sid Rachlin, East Carolina University), has shaped a program sure to provide each past member attending the conference an opportunity to hear and be heard.

Two new formats added to this year's conference are *Mini-sessions* and *Talk Times*. Mini-sessions will be presented in a room with 6-8 posters. During a 60-minute period, participants have an opportunity to join in (rotate through) three mini-sessions selected from among the options displayed on the posters. Each mini-session is repeated three times to triple your opportunity to learn. *Talk Times* provide a series of issue-specific sessions where conference participants join in an open discussion of a particular issue or concern. Focusing on the topics in this way enables the participants to find the "colleague across the hall" who can help you talk through the issues that shape your professional life.

Whether you …

- have been exploring the nature of lesson study and considering how it might be used to support the professional development of mathematics teachers or how the use of case studies aligns with lesson studies…
- have been grappling with the opportunities and challenges of teaching methods and mathematics content online at the undergraduate and graduate levels…
- are concerned with the nature of the initial mathematics content courses teachers take or what the nature of a capstone experience or the impact of NCLB on the content requirements might entail…
- are grappling with the challenge of developing professional development partnerships, or…
- whether NCATE, an age of accountability, or a personal need to know what's working and what needs to be changed has you searching for alternative assessment methods in teacher education programs…

…the AMTE 2005 Annual Meeting in Dallas, January 27–29 will provide the opportunity to *seek first to understand and then to be understood.*

The full program of this conference will be available on http://www.amte.net before November 1, 2004.

The Association of Mathematics Teacher Educators (AMTE)
Ninth Annual Conference

Dallas, TX
January 27 - 29, 2005

The Ninth Annual Conference of the Association of Mathematics Teacher Educators (AMTE) will be held in Dallas, Texas, from Friday, January 28, through Saturday, January 29, 2005. Conference activities will begin with a Pre-conference Symposium and Dinner on Thursday evening, January 27, 2005.

REGISTRATION INFORMATION

The conference registration fee includes admission to all sessions and the Browsing Room. In addition, a large portion of the fee includes continental breakfast, lunch, dinner, and afternoon snack on Friday and continental breakfast and lunch on Saturday. With your conference registration, you can renew your membership in AMTE by paying the $45 dues ($22.50 for students). The table found on the Conference Registration Form details the categories of registration. Notice that registration costs vary by postmark date, **total registration is limited to 400 participants** and there will be **no on-site registration available**, so we encourage you to register early.

PRE-CONFERENCE SYMPOSIUM and DINNER

The AMTE Pre-conference Symposium and Dinner will be held on Thursday, January 27, 2005 from 5:30 – 8:30 p.m. A separate registration fee of $48 will be charged and includes dinner. Please note that on-site registration is not available for the Pre-Conference Symposium; please make sure to register in advance for the Pre-Conference Symposium.

HOTEL RESERVATION INFORMATION

To reserve your room for the conference, call the phone number listed below or make your reservations online. Be sure to mention the "Association of Mathematics Teacher Educators" conference when you call. **The reservation deadline for the hotel is Wednesday, January 5, 2005.** Reservations made after that date will be accepted on a space-available basis at the hotel's prevailing rate.

Dallas Marriott Las Colinas Hotel
223 West Las Colinas Blvd.
Irving, TX 75039
800-264-1178 (Reservations)
Single or Double Occupancy: **$119 per night**

Procedure for on-line hotel reservations:

1. Go to https://www.marriott.com/reservations/
2. In the "By State" column, click on Texas.
3. In the list of cities, find
   Dallas: Dallas Marriott Las Colinas.
4. Enter your desired check-in and check-out dates, and the number of guests attending.
5. In the box entitled Group Code, enter SUSSUSA.
6. You will then proceed to checkout.

THERE

WILL BE

NO ONSITE

REGISTRATION

AVAILABLE!

ASSOCIATION OF MATHEMATICS TEACHER EDUCATORS
NINTH ANNUAL CONFERENCE
January 27 – 29, 2005, Dallas, TX
REGISTRATION FORM

THERE WILL BE *NO* ON-SITE REGISTRATION AVAILABLE.

Name _____ Name tag_____

Mailing Address _____ [ ] Home [ ] Institution

City _____ State/Province ____ Zip/Postal Code _____

Work Phone ( )_____ Home Phone ( )_____ Fax ( )_____

E-mail _____ Institution Name _____

CONFERENCE FEES (amounts listed are US funds)
NOTE: THERE WILL BE NO ONSITE REGISTRATION AVAILABLE. Also please note that conference registration is limited to 400 people, and registration for the Pre-conference Symposium and Dinner is limited to 170 people.

	Registration (Postmarked by Dec. 1)	Late Registration (Postmarked by Dec. 31)	Indicate Amount Paid Below
Member Registration	$220	$260	
Registration and Membership Dues	$265	$305	
Graduate Student Member Registration*	$150	$175	
Graduate Student Registration and Membership Dues*	$172.50	$197.50	
Pre-conference Symposium and Dinner (Thursday, 1/27, 5:30 - 8:30 p.m.)**	$48	$48	
Pre-conference Technology Workshop*** (Thursday, 1/27, 1:30 - 4:30 p.m.)	Free—preregistration required	N/A	____ Check here to attend
	TOTAL AMOUNT SUBMITTED		

Meals included in the registration fee:
Friday: continental breakfast, lunch and dinner buffets and afternoon snack
Saturday: continental breakfast and lunch buffet
Special dietary needs:_____(must be received by Dec. 31, 2004)
*Graduate student advisor's signature _____

**The Pre-conference Symposium and Dinner is limited to the first 170 registrants.

***The Pre-conference Technology Workshop is limited to the first 55 registrants.

If paying by credit card, please complete the following information:
Type of card (circle one): Visa MasterCard Discover
Name as it appears on the card:
_____
Card number:_____

Mail Registration Form with check made payable to AMTE to:

AMTE Conference Registration
Dr. Mark Klespis, AMTE Treasurer
Dept. of Mathematics & Statistics
Box 2206
Sam Houston State University
Huntsville, TX 77341-2206
936-294-1577
936-294-1882 (fax)

Pre-conference Technology Workshop

AMTE NINTH ANNUAL CONFERENCE, Dallas, TX

1:30 to 4:30 p.m. - Thursday, January 27, 2005

Preparing Mathematics Teachers to Teach With Technology

Presenters: Maggie Niess, Oregon State University (moderator and speaker)
Joe Garofalo, University of Virginia
Shannon Driskell, University of Dayton
David Pugalee, University of North Carolina – Charlotte
Oscar Chavez, University of Missouri

What type of preparation is needed in order to prepare teachers to teach mathematics with technology? Explore different models for integrating technology in a preservice program. Consider issues that arise as preservice teachers prepare lessons, implement their lessons, and reflect on those lessons and future lessons. Help us develop a Position Statement for AMTE.

Abstract: National standards for teachers for teaching with technology are available along with standards for students in learning with technology. Various models for preparing teachers to teach mathematics with technology are currently used: from a single technology course, to inclusion in some courses, to integration throughout the program. Students enter teacher preparation programs having learned their mathematics in particular ways with little consideration of the role of technology in learning that mathematics. What experiences are important for preservice teachers if they are to overcome their personal perceptions and learn to integrate technology as a tool for learning in their lessons? What are the integration issues for the preservice teacher to confront? What are the issues for the faculty in the preservice program? How does technology support and hinder learning in mathematics? What technologies?

During this session the presenters will describe specific models and cases where technology is integrated in teacher preparation programs. Question and answer sessions will focus on identifying best practices and ideas for supporting student teachers in preparing to teach mathematics with technology. The goal of the session will be to propose a position statement for consideration by AMTE. The AMTE Technology Committee members are the presenters for this session and will use the ideas to refine the position statement and present that statement to the AMTE Board for their consideration.

To Register: Attendance at the Pre-conference Technology Workshop is free, but **pre-registration is required**, using the **AMTE Conference Registration form available on the AMTE website or in this issue of *Connections*,** and no on-site registration will be available. Participation is limited to the first 55 registrants. Participants will be notified when their registration is received.

...presenters describe specific models and cases where technology is integrated in teacher preparation programs.

THE EXCHANGE: Order of Magnitude

Using order-of-magnitude problems to promote creativity, problem-solving skills, and confidence in preservice elementary school teachers.

Mika Munakata, AMTE Project NeXT Fellow
Montclair State University

Here I describe the use of *order-of-magnitude* problems in my mathematics course for preservice elementary school teachers. I implemented this activity with the hope that it would help my students become aware of their problem-solving strategies while stirring up discussions about reasonable estimates to problems based in real-life contexts.

Order-of-magnitude problems are also commonly known as Fermi problems. Enrico Fermi was an Italian-born, American nuclear physicist who was convinced that he could estimate any quantity within a factor of ten. He became known for such questions as "How many piano tuners are there in Chicago?" and "How much rubber wears off in each rotation of an automobile tire?" These problems are also referred to as "back-of-the-envelope" problems, because they are the types of problems one tends to figure out on scratch pieces of paper, or on the backs of envelopes.

Order-of-magnitude problems promote many of the mathematical processes we encourage in preservice elementary school teachers. In solving order-of-magnitude problems, students are encouraged to use their knowledge, grapple with the problem, persevere, and reflect upon the reasonableness of their solution. Because of the nature of reasonable solutions to order-of-magnitude problems (very large or very small numbers), students are exposed to numbers with which they are not always comfortable working. Similarly, order-of-magnitude problems stray from the idea that there is one acceptable answer in mathematics, allowing students to focus on the process rather than on the solution. Also, because data are not provided, students are forced to seek relevant information, to rely on their knowledge base, and to determine the assumptions they need to make. Finally, order-of-magnitude problems stress the use of school-taught skills such as measurement, estimation, problem solving, and computation, and emphasize the need to check the reasonableness of answers. In encouraging these processes, order-of-magnitude problems help students develop confidence when faced with unfamiliar mathematical situations and form creative strategies to solve problems.

I introduced order-of-magnitude problems in a content course for preservice elementary school teachers. My students were enrolled in the Masters of Arts in Teaching (MAT) program, for which this course is a requirement. Since most students in the course do not have extensive preparation in mathematics, the course is designed to provide them with the mathematics content knowledge they will need as elementary school teachers. While many of the activities I introduced in the course were meant to expose students to a variety of approaches to teaching and learning mathematics, I also made an effort to incorporate activities that increased my students' confidence in their mathematical skills. I thought that order-of-magnitude problems would be appropriate because they encourage exploration and have an open-ended element to them.

For this activity, I had students form groups of four. They were allowed to use any resource available to them to answer the questions below. I introduced the assignment by asking one member from each group to record the different strategies that arose during their discussions. The goal was to have students notice the range of solutions, as well as the variety of strategies employed.

1. How many postage stamps do you think would be needed to cover a football field?
2. How thick do you think a piece of computer paper is?

Order-of-magnitude problems promote many of the mathematical processes we encourage in preservice elementary school teachers.

(Continued from page 6)

3. What is the area of the Pacific Ocean in square miles?
4. How long would it take to climb the stairs of the Empire State Building to the top?
5. How many windows are on our campus?
6. How many first grade students are in New Jersey?

As I walked around the room, I noted various strategies being used by students. Some students used props such as a map of the university campus, a ruler, and an actual 37-cent stamp. The discussions were lively, and many interesting exchanges occurred, from those that centered on physical properties ("How big IS a football field?") to ones that related more to strategies ("How can we find out how many millimeters are in an inch?"). After 25 minutes, I asked for volunteers to share their strategies and their final estimates, which I recorded on the board.

Students drew upon a variety of pieces of knowledge from their everyday lives. For example, to determine the thickness of computer paper, many students relied on their knowledge of the thickness and quantity in a ream of paper. Students realized that for some of these problems, many factors influenced their estimates. The time it takes to climb the Empire State Building is, of course, dependent on the height of the building, but perhaps more than that, it depends on the physical condition of the person in question. The number of postage stamps that cover a football field depends on what area you are counting for the football field. Some groups decided to include the endzones, while others excluded them.

In terms of strategies, students used ones described in previous studies (e.g., Crites, 1992; Moore, 1987; and Siegel et al., 1982) such as unjustified guessing, justified guessing, comparisons, imagery, and decomposition. While strategies varied from group to group and from problem to problem, in many cases, students used a combination of strategies for one problem. For example, in order to determine the size of the Pacific Ocean, one group used imagery, decomposition, and comparison to determine how many times larger the Pacific Ocean is than their estimated area of the United States.

Due to the complex processes involved in solving order-of-magnitude problems, they make for interesting problems to pose to students in preservice elementary education programs. Because there is not necessarily one correct answer, the input of each participant is valid, and as a result, students feel motivated to participate, resulting in an increase in their confidence. Furthermore, their real-life contexts and open-ended nature serve as a springboard for interesting debates and discussions among the students.

Crites, T. (1992). Skilled and less skilled estimators' strategies for estimating discrete quantities. *The Elementary School Journal, 92*(5), 601-619.

Moore, J. L. (1987). *Back-of the-envelope problems*. Office of Naval Research, Washington, D.C. Personnel and Training Branch: University of California Berkeley.

Siegel, A. W., Goldsmith, L.T., & Madson, C.R. (1982). Skill in estimation problems of extent and numerosity. *Journal for Research in Mathematics Education, 13*(3), 211-232.

Students drew upon a variety of pieces of knowledge from their everyday lives.

The Exchange is a regular feature of *AMTE Connections* dedicated to sharing activities from courses for preservice teachers. If you are interested in sharing an activity from a mathematics content or methods course, please send a copy of your idea to the AMTE Connections editor at *lstalling@kennesaw.edu*.

THEORY & PRACTICE:
Modeling Appropriate Mathematics Instruction

P. Mark Taylor, University of Tennessee

In the battle to get students to unlearn less effective teaching techniques that have been modeled by their teachers for well over a decade of their lives, it is important that preservice teachers experience mathematics teaching that is consistent with what they are taught in methods courses. The Theory and Practice question for this issue is:

In what ways are you able to model appropriate mathematics instruction in your mathematics content courses for preservice teachers? Are there structures in your institution and/or department that encourage this?

Meg Moss, Mathematics, Pellissippi State Technical Community College (TN). Email: mvmoss@pstcc.edu

Teaching math content courses for prospective elementary teachers is fun, interesting, and challenging. I try to model appropriate instruction by encouraging discovery of the connections and usefulness of mathematics, by integrating technologies appropriately, and learning more myself to improve my pedagogy and curriculum. When teaching these courses it is important to know where they are coming from so I often will ask them to write a math autobiography, or complete a few prompts like "Math is …" and " Teaching math is …" It seems important to design these courses so that the preservice teachers have opportunities to understand the reasons behind the mathematics; instead, many of them come to us understanding math as a disconnected set of rules and algorithms to be memorized. The manipulative cabinet is always open and after a few weeks of encouragement and exploration, the students become very comfortable grabbing whatever manipulative they find useful. They find many uses for different manipulatives, and therefore have taught me many different ways of looking at the mathematics from multiple viewpoints.

Effective use of technology in the mathematics classroom is another method that I try to model for my students. My students and I appreciate the web activities found at www.shodor.org/interactivate. These activities are great for exploration, and can be assigned to do outside of class if you do not have the computers or time in class to do them there. Many preservice teachers come into my class not understanding effective uses of the calculator in elementary classrooms. Therefore, I do some activities in my class, as well as host a Teachers Teaching with Technology preservice teacher short course each year. (http://emptweb.mps.ohio-state.edu/shortcourse/). Through support from a National Science Foundation Advanced Technological Education grant (#0302907), we have recently purchased a smartboard, digital cameras, and a classroom set of laptops that we will be looking for ways to integrate seamlessly into math learning. If you have any ideas, please pass them along!

Institutional support has been very good as the administration values a quality teacher education program, and especially values the increased enrollment and grant funds that an improved program has brought to the college. Our vice president visited my class one day and was totally convinced that teaching these courses is very different than teaching most college math courses. Therefore, when a fellow faculty member was going to be teaching these courses for the first time, the administration gave her release time to come observe my class, which developed into a great collaborative lesson study type model. Support also came through several summer institutes. Someone asked me recently if I am a professional development

(Continued on page 9)

...after a few weeks of encouragement and exploration, the students become very comfortable grabbing whatever manipulative they find useful.

THEORY & PRACTICE question for the next issue of *AMTE Connections*: **Mathematical Knowledge for Teaching**

What types of mathematical knowledge are necessary for teaching? What have you found to be effective ways to impact that specialized mathematical knowledge?

AMTE members are urged to respond to this question. Responses will be summarized and/or quoted. You may submit your response to lstalling@kennesaw.edu

Responses submitted by February 1 will be considered for inclusion.

(Continued from page 8)

junkie, and I think it is true. I participated in a National Computational Science Institute teacher education institute (http://www.computationalscience.org/workshops/), then the summer institute "Learning Mathematics for Teaching" institute sponsored by the Center for Proficiency in Teaching Mathematics (http://www.cptm.us/), and then one of the "Preparing Mathematicians to Educate Teachers" institutes sponsored by the Mathematical Association of America (http://www.maa.org/pmet/). I learned so much, met so many great colleagues, and renewed my enthusiasm at each of these and would highly recommend participation in any of these next summer.

One challenge that I need to really analyze is finding a balance between depth and breadth, as there is so much that I want to do with these students before sending them into the classroom, but there is never enough time. Trying to figure out the best ways to spend what little time I have with them is tough. I will also be piloting a research project in collaboration with several other teacher education programs to measure the growth (hopefully) of preservice teachers' understanding of math content knowledge needed for teaching as they progress through our programs using the measures developed by the Learning Mathematics for Teaching project (http://www.soe.umich.edu/lmt/).

...the administration gave her release time to come observe my class, which developed into a great collaborative lesson study type model.

NASA Materials on Mathematics in the Real World

NASA's Center for Distance Learning produces standards-based math, science, and technology programs that use NASA research to demonstrate how concepts taught in school relate to the real world. The programs include television broadcasts, educator guides, online activities, videoconferencing, and more.

All programs are available free to educators. However, offering free resources doesn't benefit anyone if NASA does not ensure that educators are aware of these products. In an effort to increase awareness, NASA would like to give faculty members materials and samples to provide to pre-service educators in classes this fall.

Please let them know if you would be willing to share the information with your students. If you would like more information about the programs before deciding, please visit http://dlcenter.larc.nasa.gov or call Heather Grimstead at 757-864-9542.

(Continued from page 1)

Professional development to help in-service teachers use technology often competes against professional development to support major initiatives in the area of reading at the elementary and middle grade levels (PreK-8) or other seemingly pressing concerns. This leaves the teacher education community with a substantial challenge.

Role of Mathematics Teacher Educators

A goal of The Association of Mathematics Teacher Educators (AMTE) is to foster the incorporation of appropriate technology into teacher education programs in mathematics at all levels. Mathematics teacher educators play a key role in helping pre-service and in-service teachers integrate technology into the teaching and learning of mathematics. In fact, we are often preparing mathematics teachers who may become the school's formal or informal technology resource teacher. The preparation that AMTE members provide future mathematics teachers can advance the profession by infusing technology into their own instruction and requiring pre-service teachers to do the same in their field work. State and local standards set high expectations for new teachers and because of increased accountability, we need to be prepared to prove not just that our students have taken classes addressing technology in education or can create electronic portfolios, but also that they show evidence of mastery of integrating technology into their instructional activities. In addition, many pre-service teachers have a limited vision of how technology can be used in classrooms with non-traditional students because they come to us having learned mathematics in ways that may not highlight the impact technology can have on learning, while other students are experienced users of PowerPoint, spreadsheets and web-based technology. Therefore, we need to replace the vision of teaching without technology with the transformative possibilities of learning and teaching, which not only involve but fully engage technology.

AMTE members can advance the profession by infusing technology into their own instruction and requiring pre-service teachers to do the same...

There are several exciting initiatives involving technology that involve AMTE and our partner groups. In recent years, our organization's dedication to the challenge of technology infusion has been demonstrated through active participation in the National Technology Leadership Initiative (NTLI) and through work on AMTE committees. Several key initiatives will be described in detail:

- National Technology Leadership Initiative and Summit
- AMTE Annual Conference Sessions on Technology
- NTLI Fellowship Awards
- The *CITE Journal*
- The Work of the AMTE Technology Committee

National Technology Leadership Initiative and Summit

Through a grant at the University of Virginia, AMTE member **Joe Garofalo** and his colleague **Glen Bull** have developed a series of activities to act as catalysts for increased integration of technology. Each fall since 1999, representatives from the four content-based teacher education associations, AMTE (mathematics), AETS (science), CEE (language arts) and CUFA (social studies), have been a part of an exciting summit that brings together these key groups to examine "hot issues" regarding the infusion of technology into higher education and K-12 classrooms. This leadership summit encourages conversation and problem solving amongst the groups on such topics of national interest as digital images in the curriculum, open-source software, and addressing the "last mile" challenge in schools.

The most recent Technology Leadership Summit, held at the Library of Congress in Washington, D.C., was an opportunity to encourage active brainstorming by the representatives of the discipline-based associations, the editors of the major journals in educational technology, the director of the International Society for Technology Education (ISTE), corporate

(Continued on page 11)

(Continued from page 10)

partners, and key policy makers. The focus of the summit was what **Joe Garofalo** and **Glen Bull**, describe as "The Last Mile." The "last mile" is a term developed by the telecommunications industry to describe "the unwieldy mile of copper cable that inefficiently completed connections for Alexander Graham Bell's 'photophone,' the precursor to fiber optics. It is used to describe any innovation that involves exceptional expense and difficulty to complete the connection at the end point of a network that makes the innovation usable."

Garofalo and **Bull** state, "When the World Wide Web first began emerging in 1994, fewer than 3 percent of classrooms were connected to the Internet. Over the next decade tens of billions of dollars were spent through programs such as the federal e-rate initiative. This effort was successful in bringing the Internet to over 90 percent of U.S. classrooms within a decade. However, students have no device at the other end of the Internet cable to make the connection usable for learning." They go on to say, "Ironically, despite an unprecedented investment in the Internet infrastructure in schools, the greatest effect of the Internet on the academic behavior of students is taking place outside of schools."

There is much discussion around the ideas of a one-to-one computer (either hand-held or portable) option or a one-to-many solution in which a projection device is used. Although 90% of secondary students have hand-held computing options through the use of graphing calculators, this device currently focuses on the learning of mathematics. But as ideas percolate about learning tools such as easy-to-update electronic textbooks with such features as streaming video, applets, and web links, the school systems that are providing laptops to students in lieu of textbook expenditures seem to be prophetic. As Garofolo and Bull pursue this issue, The Association of Mathematics Teacher Educators (AMTE) is pleased to be supporting a FIPSE grant proposal they are submitting to explore these possibilities further. As a collaborative partner, AMTE hopes to help fulfill the project's mission to develop a teaching-with-technology model that addresses the critical issue of computer access in today's schools.

Last year, the Technology Leadership Summit participants established a permanent consortium that included representatives from the various groups, with three-year terms, to keep the topic of technology in education at the forefront of the national agenda and a focus of the members in each organization. This leadership team intends to coordinate scholarly discussions of the appropriate uses of technology while also serving as a clearinghouse for information exchange.

<u>AMTE Annual Conference Sessions on Technology</u>

Each year through funding from the NTLI grant, AMTE, as well as each of the other discipline-based professional organizations, is supported in providing technology sessions at the annual conference. In the past this has enabled AMTE to have a technology strand that uses a computer lab or other technological support without passing the high expense onto members' registration fees. This year, for the first time, we may be using wireless airports and projection devices instead of a 20-computer laboratory. Technology sessions for the 2005 conference include such topics as using online hands-on activities to teach statistics, using online video clips in professional development of teachers, using applications on the TI84+ SE Graphing Calculators, using technology to build an interdisciplinary mathematics and science methods course, and using information technology to enhance teacher quality and improve student achievement. These and other sessions hold the promise of disseminating innovative practices of integrating technology to all conference participants.

<u>NTLI Fellowship Award</u>

Each year at the AMTE conference, conference presenters within our technol-

(Continued on page 12)

This leadership team intends to coordinate scholarly discussions of the appropriate uses of technology while also serving as a clearinghouse for information exchange.

(Continued from page 11)

ogy strand who share activities, programs, and research supporting the integration of technology in mathematics teacher education are eligible for consideration for the NTLI Fellowship Award. As in the past, the presenter who delivers a most exemplary presentation integrating technology will be selected as the National Technology Leadership Initiative fellow and will be able to attend and present at the SITE conference which will be held in Phoenix, Arizona March 1-5, 2005. (See www.aace.org/conf/site for additional information). The Society for Information Technology and Teacher Education (SITE) is an international association of teacher educators who are interested in ideas and scholarship on all topics related to information technology. This year, **Susanne Harper** and **Shannon Driskell** were presented with the NTLI Fellowship Award for their exploration of ways to help preservice teachers align software selections with the NCTM Principles and Standards document. This exceptional work was presented at the 2004 AMTE conference where they shared student work and strategies to link technology into classrooms.

The innovations should demonstrate how technology enhances learning of content rather than how it aids in administrative or organizational tasks.

The *CITE Journal*

Since the summer of 2000, the content organizations have supported the peer-reviewed, online journal *Contemporary Issues in Technology and Teacher Education* (*CITE Journal*) at www.citejournal.org. The AMTE leadership is thankful for the significant contribution of co-editors **Gladis Kersaint** and **Denisse Thompson** both at the University of South Florida for establishing momentum and creating the mathematics education component of the *CITE Journal*. Poised to take over as co-editors are **Virginia (Ginny) Keen** and **Iris Johnson** from Miami University in Oxford, Ohio, with able support by a team of reviewers including these AMTE members: **Carol Fry Bohlin**, **Elaine Carbone**, **Joe Garofalo**, **Bob Horton**, **Jeffery Shamatha**, **Azita Manouchehri**, **Amy McDuffie**, **David Pugalee**, **Angela Walmsley,** and **Rose Zbiek.** The *CITE Journal* has articles that can be downloaded on such topics as using videos in an elementary mathematics methods course and descriptions of the exemplary models of technology integration by ISTE award-winning teacher education programs (for information about these awards visit http://cnets.iste.org/netsawards/). A unique feature of the *CITE Journal* is a "Submit a Commentary" interactive option that allows the reader to communicate with the author about the article.

Early each fall, the *CITE Journal* editors seek nominations from teacher educators who demonstrate innovative uses of technology either in their courses or by their pre-service teachers. The innovations should demonstrate how technology enhances learning of content rather than how it aids in administrative or organizational tasks. There are several award categories including: Introductory Technology Course, Teacher Education Methods Course, Use of Technology in a Field Experience; and Use of Technology in the Induction Years (See www.citejournal.org/awards/ for criteria and nomination information). Several of the past winners have featured articles in the *CITE Journal* that can be found in the archived issues on the website.

The Work of the AMTE Technology Committee

The AMTE Technology Committee comprised of **Maggie Niess** (Chair), **Oscar Chavez**, **Shannon Driskell**, **Virgil Fredenberg**, **Joe Garofalo**, **David Pugalee** and Board liaison **Susan Friel** is specifically charged with supporting the goal of integrating technology into the instruction of mathematics teachers. At the AMTE annual conference in Dallas, Texas, January 27-29, 2005, the Technology Committee will offer a three-hour presession on Thursday afternoon, entitled, *Preparing Mathematics Teachers to Teach with Technology*. They plan to address the question: What experiences are

(Continued from page 12)
needed in order to effectively prepare teachers to teach mathematics with technology?

The presenters will share with participants different models for integrating technology in preservice mathematics teacher education programs considering the key issues that arise as preservice teachers prepare, implement, and reflect on lessons integrating technology. The main goal of this presession will be to develop and propose a position statement for consideration by the AMTE membership that might frame how members may effectively support the incorporation of appropriate technologies in mathematics teacher education programs.

After studying many websites of similar professional organizations, the AMTE Electronic Communications Committee (now the Technology Committee), made several recommendations and as a result the AMTE website has been revamped to include a fresh, professional appearance, an easier-to-use format including a site map, better organization of the repository of information relevant to the membership, and a memorable set of visual images. The AMTE leadership is grateful for the efforts of **Mike Klass** our student webmaster at San Diego State University. Please explore the new options at www.amte.net.

Two new features that will be found on our website are there because of the generous contributions of AMTE members. **Jerry Becker** is allowing AMTE to archive his popular email updates that feature critical reports, articles, and news for the mathematics education community on our website. In addition, AMTE member **Carol Fry Bohlin** has agreed to a link that will connect directly to her well-known, weekly mathematics education news journal, ***California Online Mathematics Education Times*** **(COMET)** at http://csmp.ucop.edu/cmp/comet/

Another activity the Technology Committee is undertaking is the development of a Technology Resource section on the AMTE website. This feature will provide annotated links to technology resources that support mathematics educators as they work to integrate technology into teacher preparation programs.

Conclusion

As the NTLI grant initiatives and the formal committee work of AMTE continue to attempt to transform mathematics teacher education with the integration of technology throughout teaching and learning, pre-service teachers will enter their classrooms with the skills needed to be successful instructors. Although change frequently is slow and sometimes challenging, the technology-rich world in which we live drives the need for mathematics teacher educators to revolutionize what happens in college and K-12 classrooms.

Two new features that will be found on our website are there because of the generous contributions of AMTE members.

Since this is my last article as president for the AMTE Connections Newsletter, I would like to thank the AMTE leadership for their generous support and thank all members for allowing me the pleasure of serving the organization.

AMTE Pre-Conference Work Session
Sponsored by
The National Council of Teachers of Mathematics

NCATE Workshop for Program Reviews

Thursday, January 27, 2005
Morning Session, 9:00 - 11:30 a.m.
Repeat Afternoon Session, 1:30 - 4:00 p.m.

The mathematics program review process for NCATE has undergone a complete change in the past year. Besides the revised NCTM/NCATE mathematics standards, the program reporting process has changed even from what was reported in January 2003 at the AMTE meeting. This workshop will go through the new online report and will provide examples of assessments used to respond to the required sections of the report.

To register: E-mail ncateworkshop@nctm.org and indicate whether you will attend the morning or the afternoon session on January 27. **There is no charge to attend either of these workshops, but pre-registration is required.**

Teaching ... with a graphing calculator affords opportunities for learning, in particular, through cognitive processes of associations, pattern recognition, attention, visualizations, and an enriched teaching environment.

AMTE Pre-Conference Work Session
Sponsored by
Teachers Teaching with Technology (T^3)

Preparing Teachers to Teach Algebra with the Appropriate Use of Graphing Calculators

Thursday, January 27, 2005
Noon-4:00 p.m. (Lunch is provided at no charge.)

Teaching algebra through a function approach with a graphing calculator affords opportunities for learning, in particular, through cognitive processes of associations, pattern recognition, attention, visualizations, and an enriched teaching environment. We will use the TI-84 Plus Silver Edition graphing calculator as well as the TI-73 Explorer to examine possible teaching practices of several algebra concepts in light of these processes. Attendees will then have hands-on time with the TI-84 Plus Silver Edition to explore some of the ideas discussed. Bring your TI-82 or TI-83 Family ViewScreen Calculator, and leave with a TI-84 Plus Silver Edition ViewScreen Calculator! Absolutely free! In addition, loaners will be provided for all attendees.

Registration: Please email Ed Laughbaum at elaughba@math.ohio-state.edu by January 12, 2005 to secure a spot for this three-hour workshop. Registration is limited to 40 participants. There is a $10 fee to register, due by January 12, 2005. Please make check payable to T^3 Institute and send to:

The Ohio State University
Department of Mathematics
Attention Ed Laughbaum, T^3
231 West 18th Avenue
Columbus, OH 43210

AMTE Pre-Conference Work Session
Sponsored by
The Center for Proficiency in Teaching Mathematics

The Professional Development of Professional Developers: Continuing to Learn as Mathematics Teacher Educators

Thursday, January 27, 2005
1:00 p.m.-5:00 p.m.

Organizers/Presenters::
Deborah Loewenberg Ball, Paola Sztajn, Teresa McMahon, Bob Allen, Alison Castro, and Laurie Sleep, with closing commentary provided by Hyman Bass

Goals: An increasing focus on the need for high-quality professional development for those who teach mathematics creates a need for a "teaching force" of professional developers. This group of "teachers of teachers" is diverse, including college of education faculty, school-based professional developers, and mathematics faculty. This work session is designed to (a) frame the problem of the education of teacher educators, (b) examine and experience elements of a multi-faceted program designed to provide opportunities for teacher educators' learning, and (c) discuss the outcomes and challenges of the program.

Context: In summer 2004, the Center for Proficiency in Teaching Mathematics organized a summer institute to discuss the mathematical knowledge K-8 teachers need for teaching. A large and diverse group of "teachers of mathematics teachers" attended the institute, participating in daily sessions of a lab class. Videotapes of some of these lab classes will set the context for this work session.

To Register: If you are interested in attending, please e-mail teresam@umich.edu for a registration form. Attendance at the CPTM Pre-conference Session is free, but pre-registration is required. Space is limited to 50 participants and registration will be on a first-come, first-served basis.

New Resource from AMTE:

Online Information about Doctoral Programs in Mathematics Education

The Association of Mathematics Teacher Educators has developed a resource to provide information from institutions about their doctoral program in mathematics education. This resource will inform potential doctoral students and others interested in learning about doctoral programs in mathematics education. This directory of doctoral programs is now available at www.amte.net.

This resource allows for institutions to change and update information as needed. Institutions that have not yet provided information are invited to do so. Directions for updating and posting new entries are provided at the site.

This resource will inform potential doctoral students and others interested in learning about doctoral programs in mathematics education.

Breakfast in Baltimore!

AMTE Breakfast at the 2004 NCTM Baltimore Regional Meeting
7:30 – 8:15 AM, Friday, October 15, 2004
There will be a short program at 8:00 AM.
To be held in the Raven I Room of the Sheraton Inner Harbor Hotel
300 South Charles Street
All members and interested persons are invited to attend.

AMTE - Dates to Remember

On-line at
amte.net

Membership/
Renewal Forms

On-line
Conference
Proposals

Position Papers

Conference
Information

Other
Opportunities

2004

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	9th 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

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