

Connections



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Teacher educators need to evaluate their own knowledge, understanding, and attitudes about diverse people and issues of educational equity

Annotated Bibliography:

Infusing Equity and Diversity Issues into Mathematics Teacher Preparation

by Dorothy Y. White (dywhite@uga.edu), Sharren Thomas, Ginger Rhodes, and Kanita Kimmons DuCloux, University of Georgia

Preparing preservice teachers to teach in culturally, linguistically, and economically diverse classrooms has been a focus of most teacher education programs. There is now a growing body of literature describing the types of experiences preservice teachers need to think critically about such as issues of race, gender, language, and socioeconomic status (Garmon, 2004; Kelly, 2002; Marx, 2001; Sleeter, 2001). In order to prepare preservice teachers to address these issues, *teacher educators* need to evaluate their own knowledge, understanding, and attitudes about diverse people and issues of educational equity (Garmon, 2004). Yet, few studies have examined how to prepare teacher educators to create these learning experiences for their students. Moreover, even fewer studies have explored the types of knowledge and experiences *mathematics teacher educators* need to infuse issues of equity and diversity into methods courses.

In the spring of 2005, we embarked on the second pilot of a graduate course entitled *Critical Issues in Mathematics Education*. The goals of the course were to develop an awareness of the different theories and positions found in the literature on equity and diversity in mathematics education, examine implications of the literature for mathematics classrooms, and identify pedagogical tools for teaching mathematics methods courses. This article presents an annotated bibliography of some resources examined in the course. For each resource, a brief summary and suggested uses for teacher educators, preservice teachers, or classroom teachers are provided. This is not an exhaustive list; rather it is a source of some of the information available in the preparation of teachers to teach all students mathematics. Others are encouraged to share their research and resources with the AMTE community.

Adams, N. G., Shea, C. M., Liston, D. D., & Deever, B. (1998). *Learning to teach: A critical approach to field experiences*. Mahwah, NJ: Lawrence Erlbaum.

This book presents activities that can be used in mathematics education courses that have a field component. The book is divided into five sections, and each section begins with an introduction that summarizes the section and outlines the exercises. The exercises provide background information, an activity, a reflective narrative, and related readings. The activities range from asking students and teachers to reflect on their previous experiences and beliefs to using a framework in observing classrooms and schools. Preservice or inservice teachers can use these exercises for focused classroom observations.

Alleksaht-Snyder, M., & Hart, L. E. (2001). "Mathematics for all"—How do we get there? *Theory into Practice*, 40(2), 93-101.

This article examined how the National Council of Teachers of Mathematics has addressed equity in reform documents from 1989-2000. The authors summarized three areas of concern regarding equity in mathematics education: structural aspects of school districts, beliefs about diverse students and the learning of mathematics, and classroom processes and teaching practices. Suggestions for accomplishing equity in mathematics education are provided. Teacher educators can use this article as they discuss the various influences on the mathematics achievement of underrepresented groups.

Garmon, M.A. (2004). *Changing preservice teachers' attitudes/beliefs about diversity:*

(Continued on page 4.)

Nominations Sought for Upcoming AMTE Elections

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<http://www.amte.net>

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The AMTE Nominations Committee is seeking nominations for consideration as candidates for *Treasurer* and for *Board Member-at-Large* by **July 15, 2006**. Please review the job descriptions below. To nominate a candidate, send the individual's name, professional affiliation and position, email address, and several sentences describing his or her qualifications for the position to the chair of the Nominations Committee, William Speer at william.speer@unlv.edu or mail to William Speer, CEB 301, COE, UNLV, 4505 Maryland Parkway, Las Vegas, NV 89154-3001.

Be sure to indicate whether the nomination is for treasurer or for the board member-at-large position. Nominations of colleagues and self-nominations are permitted. Before selecting any potential candidate on the election slate, the Nominations Committee will verify his/her willingness to serve. After reviewing all the nominations submitted by the July 15 deadline, the Nominations Committee will formulate an election slate, taking into consideration both professional qualifications and diversity (e.g., years of experience; racial or ethnic background; professional affiliation – from the Mathematics Departments or College/School of Education or other affiliation; size of institution). *Send complete nominations to William Speer* (william.speer@unlv.edu) *by July 15, 2006*.

Treasurer: The Treasurer shall ensure that all revenues and expenditures of AMTE be in conformity with the Constitution, Bylaws, and policies of the AMTE; shall be responsible for maintaining records of all monies received and paid in the name of the Association; shall maintain a current and accurate membership list; shall maintain the Association's non-profit status; shall transact the financial affairs of the Association upon recommendation of the Board of Directors; and shall prepare financial reports to be presented at the meetings of the Board of Directors and prepare an annual report to be presented at AMTE's annual business meeting.

The term of office for the treasurer of AMTE shall be three years. The treasurer shall assume office at the end of the annual meeting at which their election is announced. Elected officers may serve only one term in a specific office.

The treasurer has a commitment to two (2) meetings per year, one held prior to the NCTM Annual Meeting and the other at the AMTE Annual Conference (usually in January).

Board Members-at-Large: The Members-at-Large shall assume those responsibilities determined by the President. A major duty of the Member-at-Large is to support and advise the president of AMTE. The Member-at-Large serves as a Board liaison to one or more committees or task forces. The Member-at-Large is responsible for reporting on the progress of his/her assigned committee(s) or task force(s) at Board meetings.

The terms of office for the elected Members-at-Large shall be three years. Members-at-Large shall assume office at the end of the annual meeting at which their election is announced. Members-at-Large may serve only one term in a specific office.

The Members-at-Large have a commitment to two (2) meetings per year, one held prior to the NCTM Annual Meeting and the other at the AMTE Annual Conference (usually in January).

Connections is published three times a year: fall, spring, and summer. The Editorial Board will consider a wide variety of types of submissions. Regular features include essays addressing each issue's Theory and Practice question, reviews of resources for mathematics teacher educators, and news articles related to mathematics teacher education. Each submission is reviewed by the editorial board for relevance to the AMTE membership and for quality of work. Please direct all comments, questions, or submissions to the editor at lstalling@kennesaw.edu or 770-420-4477.

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AMTE News and Announcements

Membership Database:

In an effort to continue to expand AMTE's services to members, the AMTE Board of Directors has decided to move from a hard-copy directory, published once every two years, to an interactive, online version. The online directory will be available in the members-only section of the AMTE website, requiring individual passwords for access. Each AMTE member soon will receive an email updating them on this change and providing with the opportunity to have any or all of their data excluded from this online directory. If you have any questions or comments, please contact Nadine Bezuk, AMTE's Executive Director, at nbezuk@mail.sdsu.edu.

AMTE 2007 Annual Conference News:

Make your plans now to attend the 2007 AMTE Annual Conference in Irvine, California on January 25-27, 2007. New this year is the opening session that will begin at 7:00 PM on Thursday; it will be followed at 8:30 by a light reception. Dinner is on your own on Thursday. As usual, all meals on Friday and through lunch on Saturday are included in your registration fee.

The conference site is the Hyatt Regency Irvine Hotel. The hotel room rate is \$139 for a single or double room. The deadline for reservations is December 29, 2006 or when the room block is full. If the room block is filled prior to the deadline, the hotel will accept reservations at the hotel's prevailing rate and only on a space-available basis. More information on registration and details about hotel reservations and conference activities can be found on the AMTE web site. We hope to see you in California in January!

AMTEC Affiliate News:

The First Annual Association of Mathematics Teacher Educators of Connecticut (AMTEC) conference will be held on Saturday, September 30, 2006 from 9-12:30 pm. You can find more information about AMTEC at <http://www.math.ccsu.edu/amtec/>.

Committee Updates:

The **Constitution & Bylaws Committee**, chaired by Janet Caldwell (Rowan University), is currently reviewing and updating AMTE's governance documents. As they audit those documents against current practice, the committee will consider issues such as the use of email for AMTE communications and the inclusion of the conference coordinator position.

The **Awards Committee** is chaired by Jeff Wanko (Miami University). The Board of Directors of the Association of Mathematics Teacher Educators established an Award for recognition of Excellence in Mathematics Teacher Education, to be awarded annually to a mathematics teacher educator of national recognition at AMTE's annual meeting. This award recognizes excellence in each area of mathematics teacher education (teaching, service, research) on a rotating basis. In 2007, the Excellence in Service to Mathematics Teacher Education will be presented. More information is available at <http://www.amte.net>.

The **Membership Committee**, chaired by Tim Hendrix (Meredith College), has goals of adding new members, maintaining current membership, and publicizing AMTE member benefits.

The **Elections Committee** is chaired by William Speer (University of Nevada-Las Vegas) and has the goals of soliciting nominations, compiling a slate of nominees, and preparing the ballots.

Chaired by Barbara Dougherty (University of Mississippi), the **Organization Connections Committee** has goals of formalizing and extending relationships with other professional societies and promoting support for and communication with AMTE Affiliates. They plan to standardize the amount of information on <http://www.amte.net> for each affiliate, to hold a session at the 2007 Annual Conference for current and potential affiliates, and to strengthen connections to early childhood mathematics educators.

The **Technology Committee**, chaired by Maggie Niess (Oregon State), has a large and active membership who are collaborating on papers and presentations, working to secure funds for an NTLI fellow, and developing a survey to make recommendations on AMTE's website. Recently this group developed AMTE's official position statement on preparing teachers to use technology to enhance the learning of mathematics. It can be found at <http://www.amte.net>.

A newly-charged committee of AMTE will assume the administration of the **Teacher Education Materials Project** (TE-MAT, <http://www.te-mat.org/>). This group will be led by David Pugalee (North Carolina-Charlotte) and Lisa Wilson Carboni (Duke). Field testers will review mathematics education materials; those reviews will be available on the website in an electronic database.

Make your plans now to attend the 2007 AMTE Annual Conference in Irvine, California on January 25-27, 2007.

An Annotated Bibliography:**Infusing Equity and Diversity Issues** (Continued from page 1.)

Six major factors are described that were associated with the development of greater multicultural awareness and sensitivity in preservice teachers.

What are the critical factors? *Journal of Teacher Education*, 55, 201-213.

Six major factors are described that were associated with the development of greater multicultural awareness and sensitivity in preservice teachers. Three were dispositional: openness, self-awareness/self-reflectiveness, and commitment to social justice; and three were experiential: intercultural experiences, support group experiences, and educational experiences. Preservice teachers' dispositions and personal experiences with diversity are strong indicators of how well teacher education programs can influence their beliefs. Garmon argued that these factors should be considered when making admission decisions, designing multicultural courses, and structuring field experiences. Teacher educators and researchers will learn how preservice teachers perceive multicultural issues, and may want to examine these factors within the context of mathematics education.

Gutstein, E., & Peterson, B. (2005). *Rethinking mathematics: Teaching social justice by the numbers*. Milwaukee: Rethinking Schools.

This book is a collection of articles written by classroom teachers and teacher educators who promote culturally relevant teaching practices. The book includes four parts; the first three consist of teachers' reflections, lesson plans, and teaching ideas that incorporate social justice issues in the mathematics curriculum or infuse mathematics throughout other curricular areas. The final section describes various resources such as web sites, curricula, and books. The book is valuable for classroom teachers, preservice teachers, and teacher educators.

Kelly, C. A. (2002). **Creating equitable classroom climates: An investigation of classroom strategies in mathematics and science instructors for developing preservice teachers' use of democratic social values.** *Child Study Journal*, 32, 39-52.

Best practices to enhance students' knowledge of gender equity, and their ability to create equitable classroom practices are presented for two integrated mathematics and science methods courses. Preservice teachers focused on gender equity by reading current literature, developed and analyzed teacher-related materials, observed classrooms and developed lesson plans. Based on pre- and post-surveys, the instructional methods increased participants' understanding and application of equitable classroom practices. Teacher educators will learn strategies for use in methods courses from this article.

Ladson-Billings, G. (1998). **Just what is critical race theory and what's it doing in a nice field like education?** *International Journal of Qualitative Studies in Education*, 11(1), 7-24.

In this article, Ladson-Billings provides a comprehensive review of the principles and tenets of critical race theory (CRT). She then uses CRT as a tool to reveal the continued inequities students of color experience in education, particularly in the areas of curriculum, instruction, assessment, school funding, and desegregation. She particularly brings forth the realities of how racism and issues of privilege are sustained in schools in the U.S. Teacher educators and graduate students need to devote time to read, discuss, and learn the concepts of CRT in order to critically analyze educational reform and to prepare preservice teachers.

Martin, D. B. (2003). **Hidden assumptions and unaddressed questions in mathematics for ALL rhetoric.** *The Mathematics Educator*, 13(2), 7-21.

Martin critiqued mathematics reform documents and the notion of *Mathematics for All*. He argued that despite the calls for modifications in mathematics curricula, teaching, learning, and assessments, reform documents do not address the need to teach and learn mathematics for social justice. He also exposed the hidden assumptions and unaddressed questions within the mathematics

Fall Issue Theory & Practice Question:

More than forty states have revised all or some of their K-12 curricula since 2000. If your state has undertaken such a revision, what was the motivation? How does your state's new curriculum differ from the previous one? What has been instructive or challenging about the revision process and the implementation of the new curricula in your state?

AMTE members are encouraged to respond to this question with an essay of 1000-1200 words. Submit your response to *Connections* Editor Lynn Stallings (lstalling@kennesaw.edu) by September 7 to ensure consideration for the fall issue.

for all rhetoric such as the marginalization of equity issues within mathematics education research and the restrictive definitions of equity. Teacher educators, researchers and graduate students can benefit from this critical analysis of equity in mathematics education.

Marx, S. (2001). How whiteness frames the beliefs of white female pre-service teachers working with English language learners of color. Paper presented at annual meeting of the American Educational Research Association, Seattle, Washington.

Marx reported her research of nine White female preservice teachers' beliefs about English speaking children of color. Using critical race theory, Marx sought to help participants identify instances and become aware of the affects of White racism and Whiteness on their beliefs. Marx described four ways the preservice teachers' beliefs were influenced and the challenges of moving the students to greater awareness and becoming better teachers. Seven of the nine preservice teachers moved to a point where they became aware of how White racism influenced their beliefs and how these beliefs impacted children. Teacher educators are provided with insights into preservice teachers' beliefs about diversity and methods to intervene to influence these beliefs.

Moschkovich, J. N. (1999). Understanding the needs of Latino students in reform-oriented mathematics classrooms. In L. Ortiz-Franco, N. G. Hernandez, & Y. De La Cruz (Eds.) *Changing the faces of mathematics: Perspectives on Latinos*. (pp. 5-12). Reston, VA: NCTM.

Moschkovich examined whether the emphasis on communication and collaborative work in reform-oriented mathematics classrooms create barriers for Latino students to participate and learn in mathematics classrooms. She argued that Latino students are often placed in mathematics classrooms based on their English proficiency, not based on their mathematics knowledge and this can lead to repetition and boredom. Four strategies to guide mathematics instruction for Latino students are offered. Preservice teachers can read and discuss the recommendations in class and incorporate them into their lesson plans.

Reyes, L. H., & Stanic, G. M. A. (1988). Race, sex, socioeconomic status, and mathematics. *Journal for Research in Mathematics Education*, 19(1), 26-43.

Reyes and Stanic make the case that factors of race, sex, and socioeconomic status (SES) should not be examined in isolation when considering the

differential performance in mathematics among groups of students. A model is presented that includes five factors to explain differences in mathematics achievement: societal influences, school mathematics curricula, teacher attitudes and achievement-related behavior, and classroom processes. Authors conclude that research is needed to understand certain elements of the models and the causal connections among the factors. Teacher educators and researchers can use the model to conceptualize their research and discuss how equity research in mathematics education has progressed over the years.

Secada, W. G. (1989). Agenda setting, enlightened self-interest, and equity in mathematics education. *Peabody Journal of Education*, 66(2), 22-56.

Secada distinguished between equity and enlightened self-interest when developing an agenda for equity in mathematics education. He argued that our enlightened self-interest must ensure adequate mathematics preparation of women, minorities, and the poor. Secada described several points in which the agendas developed from a stance of equity versus one of enlightened self-interest may diverge and overlap and concluded with three ways that setting an agenda might proceed. This article is appropriate for teacher educators, researchers, and those who set agendas in mathematics education.

Simms, J., Reynolds, T., Padwa, L., Roeder, J., Rector, L., Gromko, M., Anderson, K., Jones, P., Wick, C., & Shaw, Y. *Micro-Inequity Skits*. Last retrieved, May 14, 2006, <http://www.woodrow.org/teachers/math/gender/07skits.html>

The *Micro-Inequality Skits* are designed to motivate discussions of gendered inequities in mathematics and science. The authors' offer the use of skits to address and frame particular gender biases in a humorous and non-threatening way. Some skits involve registering for high school math and science courses, discussions during faculty meetings, and classroom interactions. Undergraduate and graduate students can act out the skits as they uncover the subtle, yet common, nuances that perpetuate gender biases in schools and mathematics classrooms.

Sleeter, C. E. (2001). Preparing teachers for culturally diverse schools: Research and the overwhelming presence of whiteness. *Journal of Teacher Education*, 52(2), 94-106.

Sleeter synthesized research studies of teacher preparation programs designed to prepare teachers

There is now a growing body of literature describing the types of experiences preservice teachers need to think critically about such as issues of race, gender, language, and socioeconomic status

(Continued on page 7.)

AMTE 2006 – 2007 Committees and Task Forces

Each committee has an AMTE Executive Board Member as a liaison. Those liaisons are denoted with an asterisk. Committee chairs are denoted with a double asterisk.

STANDING COMMITTEES

Awards

Tasks: Solicits nominations and selects AMTE members for awards recognizing outstanding teaching, research, and service in mathematics teacher education.

Tom Bassarear, Keene State University*
 Mary Garner, Kennesaw State University
 Hank Kepner, University of Wisconsin-Milwaukee
 Winnie Peterson, Kutztown State University
 Barbara Reys, University of Missouri
 Kate Riley, California Polytechnic State University
 Jeffrey Wanko, Miami University-Oxford**

Constitution and By-laws

Tasks: Revisits the constitution and by-laws making suggestions and changes as needed.

Janet Caldwell, Rowan University**
 Ginny Keen, Wright State University
 Travis Olson, University of Missouri
 Al Otto, Illinois State University
 Ingrid Peterson, University of Kansas
 Sid Rachlin, East Carolina University*

Membership

Tasks: Works on issues associated with AMTE membership, including benefits of membership and increasing the number of members (e.g., attract members from our affiliate organizations).

Dana P Franz, Mississippi State University
 Tim Hendrix, Meredith College**
 Mark Klespis, Sam Houston State University*
 John Lannin, University of Missouri
 Travis Olson, University of Missouri
 Paola Sztajn, University of Georgia
 Jane Wilburne, Pennsylvania State University Harrisburg

Nominations and Elections

Tasks: Solicits nominations and compiles a slate of nominees; prepares the content for the ballot

Jennifer Bay-Williams, University of Louisville*
 Michael Chappell, Middle Tennessee State University
 Terry Crites, Northern Arizona University
 Co Di Fi, University of North Carolina at Greensboro
 Bill Speer, University of Nevada, Las Vegas**

Nominations and Elections (continued)

Tad Watanabe, Kennesaw State University

Organization Connections Committee

Tasks: Formalizes and extends relationships with other professional societies and promotes support for and communication with AMTE Affiliated Groups.

Kathryn Chval, University of Missouri
 Barbara Dougherty, University of Mississippi**
 Carol Marinas, Barry University
 Susann Mathews, Wright State University*
 Robert Stein, Cal State University San Bernardino
 Tamas Szabo, Weber State University
 Jeremy Winters, Middle Tennessee State University

Technology

Tasks: Recommends policy related to the AMTE website, NTLI, and technology issues.

Christine Browning, Western Michigan University
 Oscar Chavez, University of Missouri
 Suzanne Harper, Miami University
 Gary Martin, Auburn University*
 Maggie Niess, Oregon State University**
 Bob Ronau, University of Louisville
 Marcia Weinholt, Purdue University

TASK FORCES

Mentoring Task Force

Purpose: to seek ways to mentor new faculty and doctoral students in teaching, scholarship, and professional responsibilities while networking with other mathematics teacher educators.

Tom Bassarear, Keene State University*
 Gail Burrill, Michigan State University**
 Tim Hendrix, Meredith College
 Judy Covington, Louisiana State University
 Chris Rasmussen, San Diego State University
 Viji Sundar, Cal State University Stanislaus

Teaching Resources Task Force

Purpose: to identify essential readings in the field of mathematics teacher education and to communicate critical books, journals, and documents to the membership and other interested individuals.

Mary Margaret Shoaf, Baylor University
 Susan Friel, University of North Carolina at Chapel Hill

Teaching Resources Task Force (continued)

Peg Smith, University of Pittsburgh
 Tom Bassarear, Keene State University
 M. Lynn Breyfogle, Bucknell University
 Amy Roth McDuffie, Washington State-Tri Cities
 Kathy Morris, Sonoma State University

TE-MAT Task Force

Purpose: to establish procedures for identifying and reviewing mathematics professional development materials, with the understanding that the reviews will be considerably briefer than those currently in TE-MAT, and will be limited to describing rather than evaluating the materials.

Jennifer Bay-Williams, Kansas State University
 David Pugalee, University of North Carolina, Charlotte

TE-MAT Task Force (continued)

Executive Committee
 Francis (Skip) Fennel, McDaniel College
 Bill Bush, University of Louisville
 Virginia Bastable, Mount Holyoke College
 Madeleine Long, AAAS
 Judith Mumme, West Ed

Field Testers

JoAnn Cady, University of Tennessee/Knoxville
 Linda Crawford, Augusta State University
 Betsy Darken, UT-Chattanooga University
 Michael Gilbert, Eastern Washington University
 Sue Brown, University of Houston Clear Lake
 Lisa Carboni, Duke University

(White, continued from page 5.)

to teach in multicultural schools. She argued that most programs focus on addressing White preservice teachers' perspectives and experiences with diversity, instead of examining particular strategies to prepare strong teachers. Several areas for further research in teacher education are offered. Teacher educators and graduate students can garner ideas to include in their teacher education programs or research endeavors.

Tate, W. F. (1995). Returning to the root: A culturally relevant approach to mathematics pedagogy. *Theory into Practice*, 34(3), 166-173.

Tate explained how traditional mathematics instruction does not meet the needs of most African American students and offered *culturally relevant mathematics pedagogy* as a viable alternative. Examples from a middle school teacher illustrate the components of this pedagogy and how mathematics

is taught within the context of social change and community problem solving. Preservice teachers can read and discuss the ideas and incorporate them in their lesson plans and mathematics lessons.

Tsang, S. L. (1984). The mathematics education of Asian Americans. *Journal for Research in Mathematics Education*, 15, 114-122.

This article reviewed the available literature on the mathematics achievement of Asian-American students and found that most studies only examined the performance of Chinese American and Japanese American students. Tsang argued that to understand the mathematical learning of all Asian American students, more research is needed to reflect this ethnically diverse community. Teacher educators can become cognizant of the various cultures of Asian American students and the challenges they may face in learning mathematics.

*CITE's Featured Mathematics Education Article:*

The Effects of Mentor-Supported Technology Professional Development
 on Middle School Mathematics Teachers' Attitudes and Practice
 Bonnie Swan and Juli Dixon, University of Central Florida

CITE is an online, peer-reviewed journal, available at <http://www.citejournal.org>. This journal is jointly sponsored by five professional associations, including AMTE, AETS, NCSS-CUFA, CEE, and SITE. The journal's online medium also allows authors to demonstrate the technologies about which they are writing, including video and audio segments, animation, virtual reality, Web links, and simulations. The mathematics education editors of the *CITE* are Iris Johnson (johnsoid@muohio.edu) and Ginny Keen (ginny.keen@wright.edu).

The Essentials of Effective Alternative Teacher Education Programs

Mathematics teacher shortages nationwide mean that mathematics teacher educators are being asked to provide nontraditional programs to prepare students for certification. What are the essential parts of preparation for initial licensure? What are the core components of successful programs? What are your recommendations for a colleague charged with developing such a program?

Response by Clara Nosegbe (cnosegbe@gsu.edu) and Becky Patterson, Georgia State University

One goal of education is producing students who are able to reason and think critically in order to enhance the quality of living for everyone. At the foundation of this goal is the production of teachers who are able to understand how to develop, utilize, and adapt curricula in ways that meet the needs of students (Darling-Hammond, 2005). Effective instruction within a performance-based classroom may be undermined by the “pedagogy of poverty,” which Haberman (1991) describes as instruction based on control and basic skills rather than education and critical thinking. Teacher education programs must perform a balancing act involving politics, the tension between practice and research, and the educational needs of all children. In this paper, we examine the work done at our university in providing a quality alternative teacher preparation program in middle grades mathematics and science.

Candidates of the alternative preparation program in Middle Childhood Education Teacher Education Environment in English, Mathematics, Science, and Social Studies (MCE TEEMS) will be able to meet the Georgia Professional Standards Commission requirements for a Master’s degree and initial teaching certificate in Middle Childhood Education with a concentration in Mathematics and Science. In meeting the university’s requirements for this graduate program, MCE TEEMS students also become proficient in technology usage and integration into instruction, and become knowledgeable of the professional ethical standards for certification and employment. Our program focuses on field experiences in low-achieving schools, thus providing opportunities for students to critically reflect on their contributions to improving achievement of all middle grades students. MCE TEEMS stresses the importance of multicultural education and educating children with special needs.

Curriculum reforms are taking place all over the country, and professional development schools and institutes are being developed to ensure that teachers’ content knowledge and skills are continually being strengthened and updated (Loucks-Horsley, Love, Stiles, Mundry, & Hewson, 2003). MCE TEEMS requires knowledge in the specified content areas for middle grades and requires four graduate level content courses. Although content knowledge is helpful in the classroom, it cannot be truly effective without pedagogical practice of that knowledge. MCE TEEMS relies heavily on pedagogical preparation (Wilson, Floden, & Ferrini-Mundy, 2002), including instructional methods, learning theories, educational measurement and testing, educational psychology, and foundations of education. Subject matter is explored within the context of teaching and learning.

Theory and research cannot adequately prepare our students in the teacher education program without being put into practice. Darling-Hammond (2006) asserts that “teachers need highly refined knowledge and skills for assessing pupil learning and they need a wide repertoire of practice-along with the knowledge to know when to use different strategies for different purposes” (p. 304). During the summer field experience, students are enrolled in a diversity course and a reading course while working with children in grades 4-8. For MCE TEEMS students, these field experiences provide opportunities for (a) one-on-one tutoring of at-risk students, (b) whole-class instruction, (c) observations of effective teaching practice and critical reflection, and (d) collaboration with peers and experienced educators. Student teaching is the culminating experience in this teacher education program. It is a natural extension of methods courses and previous practicum experiences. It asks students to apply various aspects of their professional education preparation in a school setting over an extended period of time. During student teaching, students participate in on-site planning and debriefing sessions with cooperating teachers, videotape their own lessons in order to improve their classroom practice and instructional techniques, and practice classroom management techniques. Throughout these field experiences, each student works with a university supervisor who provides feedback and evaluation.

MCE TEEMS coursework incorporates field-based assignments that address cultural diversity and the use of culturally relevant pedagogy.

Teacher education programs must perform a balancing act involving politics, the tension between practice and research, and the educational needs of all children.

Culturally relevant pedagogy acknowledges that a teacher's culture (a) influences classroom dynamics, (b) infuses course content with perspectives that are relevant to students' cultural backgrounds, and (c) adopts and adapts teaching styles that recognize how culture affects student learning (Foster, 1995; Hilliard, 1992). The diversity content in the summer activities and throughout the ongoing professional development seminars stresses the importance of a teacher's attitudes and beliefs about diversity on the classroom climate. Each student in MCE TEEMS completes an action research project on his or her impact on student learning in the classroom during the student teaching experience. This allows for yet another opportunity for students to incorporate theory into practice. Course and program assessments are guided by the standards of the National Council of Teachers of Mathematics, the National Middle School Association, the National Board Professional Teaching Standards, and the Interstate New Teacher Assessment and Support Consortium. Candidates develop lessons grounded in these standards and the Georgia Performance Standards (Georgia's newly adopted curriculum standards).

Mentoring within the MCE TEEMS program keeps our retention levels high. Our program is designed to meet the needs of both students embarking upon their first career and those transitioning into a new life's work. Information, experiences, and skills are shared with our students by contact with graduates of other TEEMS programs in the college, retired educators, university faculty, and current practitioners (Mullen, Cox, Boettcher, & Adoue, 2000). This relationship is a strong complement to the theory provided in MCE TEEMS coursework.

A successful teacher education program must provide students with all up-to-date, innovative methodologies, strategies, and techniques needed for the 21st century. First and foremost, students must be competent in their chosen field of study. There can be no guesswork when imparting knowledge and understanding to the students we serve. A successful teacher education program must explore instructional delivery styles that will match the learning abilities of all learners. Such a program must provide in-depth approaches and strategies in the area of student classroom management and discipline. Finally, a successful teacher education program must teach teachers how to effectively use student assessments and evaluations to promote student learning.

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Response by Linda Reichwein Zientek (zientek@alpha1.net), Theresa Wahrmond, and Becky Garlick, Blinn College

Researchers have concluded effective alternative teacher certification (ATC) programs should contain: (1) academic preparation, (2) mentoring, (3) field-based experiences, (4) group preparation, and (5) collaborations between educators of all levels (Ruckel, 2000). Teacher preparation now extends beyond universities to include ATC programs offered at regional service centers, community colleges, and for-profit agencies. Blinn College in Brenham, Texas is just one of many community colleges preparing teachers. The Blinn College Teacher Education Alternative Certification Host (TEACH) program was created as "a cooperative effort between Blinn College and the school districts in its service area to provide quality, affordable secondary alternative teacher certification to assist in meeting area school districts' personnel needs" (Garlick, 2006, p. 1). In Texas, ATC programs follow the State Board for Educator Certification's (SBEC) research-based guidelines for developing effective teacher preparation programs.

In a review of research, Allen (2003) concluded (Zientek, continued on page 10.)

Mentoring within the program keeps our retention levels high.

The Essentials of Effective Alternative Teacher Education Programs

Response by Zientek (Continued from previous page.)

content knowledge was important for effective teaching but that results were inconclusive on the need for holding a major in the teaching area. Allen corroborated findings by Monk (1994) who found a possible threshold effect around five mathematics courses. While few would debate the importance of content knowledge, a discussion continues on the impact pedagogy courses have on teacher effectiveness (Allen, 2003; Monk, 1994; Wilson, Floden, & Ferrini-Mundy, 2002). Despite the lack of conclusive research, theory courses have been linked to teacher attrition (SBEC, 2003). Monk (1994) determined mathematics education courses had a positive impact on teacher effectiveness. Another study by Zientek (2006) found that teacher's perceptions of preparedness were impacted by whether or not programs included instruction in curriculum design, lesson planning, assessments, multidiversity, and classroom management.

Pedagogical training should address the cognitive development of the learner including (a) limitations of the developing brain, (b) how teaching objectives are impacted by cognitive stage development, (c) an awareness of the general adolescent or preadolescent nature of their students, and (d) an understanding of what engages the learner. In an effort to boost student retention, the National Association of School Psychologists (2003) "recommends that educational professionals . . . adopt age-appropriate and culturally sensitive instructional strategies that accelerate progress in all classrooms" (p. 4).

Pedagogical training should also include instruction in classroom management. Meister and Melnick (2003) found beginner teachers were concerned about behavioral management and meeting the needs of a diverse student population. Teacher candidates must become familiar with strategies to manage their students, their time, and their resources allowing for more time for teaching, rather than managing and disciplining students. More time engaged on learning will result in an increase in student achievement (Aronson, Zimmerman, & Carlos, 1998).

Mentoring should also be included in effective ATC programs (Humphrey & Wechsler, 2005; Zientek, 2006). The Texas Beginning Educator Support System (TxBESS) was established to provide support for beginning teachers in the form of standards-based preparation for mentor teachers

(SBEC, 2005). Collaborations are created with school districts and teacher preparation programs. A support team comprising the principal, a mentor teacher, and a representative from the teaching program is created, and criteria for mentors are established. Ongoing support and training for the mentors result in support for interns throughout the school year. The Blinn College TEACH program takes mentoring one step further by requiring principals or assistant principals to complete training designed to help them better support their first year teaching interns. Principals are asked to consider scheduling, number of preparations, and involvement in extracurricular activities. Additionally, they are given guidelines on providing feedback, including multiple informal walk-throughs (Garlick, 2006).

Effective ATC programs also include field-based experiences. Parkay (1982) found that field experience impacted effectiveness in the classroom. Zientek (2006) found teacher's perceptions of preparedness depended upon field-based experiences. Results from the National Schools and Staffing Survey support the notion that field-based programs are important, with teachers who did not receive student teaching, classroom observations, or feedback leaving the profession at higher rates (SBEC, 2003).

Recommendations to a colleague developing a program would include establishing entrance and exit requirements, pedagogy and content courses, as well as including field-based and mentoring components in the program. One entrance requirement of the Blinn College TEACH program is an on-campus interview to determine candidate's suitability for the teaching profession. The interview committee comprises Blinn instructors from both the pedagogy and mathematics courses as well as representatives from school districts. The school district representative, who is usually the principal or assistant principal, often takes this opportunity to screen teacher candidates for prospective jobs in his or her school district. In addition to the interview, applicants must have a bachelor's degree with an overall GPA of 2.5 or higher and a 2.5 or higher GPA in 12 hours of approved mathematics courses, which include statistics and calculus. Teachers must complete and demonstrate mastery in their content training by obtaining a 75% or higher average in the program's mathematics course. Other exit requirements include passing all required state

(Zientek, continued on page 14.)

No level of content knowledge can make up for a chaotic classroom.

AMTE Affiliate Local Conferences

by Tamas Szabo, Weber State University, tszabo@weber.edu

I will share some experiences of organizing the Utah Association of Mathematics Teacher Educator's annual conferences of UAMTE, the Utah affiliate. While this model may not fit all affiliates' needs, I hope it will be a useful starting point for others. We have made improvements for six years, and we have met annually since 2001 with increasing attendance each year.

Some AMTE affiliates hold their conferences in conjunction with other meetings, but we have decided to have a separate day (the last Saturday of every February, unless there is a conflict) for the UAMTE annual conference. The location usually is the institution of the president-elect, who is charged with organizing the conference. Utah's geography allows everyone to reach any of the conference locations within a three-hour drive; those living near Salt Lake City have a one-hour drive.

The conference runs for a whole day (about 8:00 AM to 4:00 PM) and has the goals of providing Utah mathematics teacher educators opportunities to share their current work and form discussion groups around statewide issues of current interest. The registration fee is \$30, which includes membership in UAMTE, and covers all the expenses of the conference. Participants and members of the organization are mostly mathematics teacher educators, but school district representatives and graduate students attend too. The program of the conference has usually four main parts, as well as the lunch, coffee breaks, and the welcome address of university dignitaries.

Keynote Address: We invite out-of-state mathematics educators of excellence to make presentations, and provide some information about other states' problems with training mathematics teachers. In 2006, UAMTE was fortunate to have Randy Phillip from San Diego State University as our keynote speaker.

Research Sharing Session: For the first few years of the conference, we had hour-long research talks in parallel sessions, but we found a format that fits our needs better. We spend an hour together where everybody describes his or her current research interest in a couple of minutes. This can be done with no preparation, and sparks a lot of further discussions when people with similar interests find each other. Having this session means that the discussions that begin in this session can continue over lunch.

Business Meeting: Like every organization, we have to elect our officers, approve our budget, and so forth. This business usually takes a short time after lunch or during dessert, and is the last time the whole group is together in the same room.

Discussion Groups: Topics are selected before the conference by the organizing committee based on members' suggestions, and are in the printed program. Usually we have two parallel sessions, one targeting elementary teacher training and another at the secondary level. Some recent topics have been "student teaching," "capstone courses," "technology in the methods and technology courses," "prerequisites and sequencing of mathematics for elementary teachers courses," and many other similar topics over the years. Sometimes UAMTE prepares a position statement after such a discussion session and forwards it to legislators.

The day of the UAMTE conference is one I look forward to every year and sacrifice a Saturday for without hesitation. The conference has value beyond the actual presentations and discussions. It provides face-to-face interaction with our closest colleagues, opportunities to initiate collaborations, and friendships. Out-of-state visitors are welcome, so if you happen to be around, stop by and check it out for yourself.

Congratulations to AMTE's newest affiliate, the Tennessee Association of Mathematics Teacher Educators!



NCTM's *ON-Math* is an electronic journal designed exclusively for publication on the web. The mission of the journal is to "provide a wide range of ideas for learning and teaching mathematics at any

level." This NCTM member benefit will be publicly available through June 2007 so that mathematics educators can share it with their students.

ON-Math is a refereed journal and is currently soliciting submissions. More information on the journal, including writing guidelines and past issues, is available at www.nctm.org by clicking the *ON-Math* logo near the bottom of the page or at http://my.nctm.org/eresources/journal_home.asp?journal_id=6. Contact *ON-Math* editor Doug Brambaugh (brumbad@pegasus.cc.ucf.edu) or NCTM liaison Sandy Berger (sberger@nctm.org) if you have questions about the journal.

A Review of *Studying Teacher Education*

Studying Teacher Education: The Report of the AERA Panel on Research and Teacher Education. Marilyn Cochran-Smith & Kenneth M. Zeichner (Eds). (2005). Mahwah, NJ: Lawrence Erlbaum. 804 pp. + vii. ISBN 0-8058-5592-0 \$79.95 (pb).

by Karen B. Cicmanec, Morgan State University

What is known about who is planning to teach mathematics? What criteria may be used to select the best math teacher among those qualified to teach? What do we know about who is leaving mathematics teaching and who remains in the professional pipeline? What are the components of a good mathematics teacher preparation program? There is growing interest among researchers, practitioners, and policy makers in finding answers to these challenging questions. The recent NCTM Research Committee call to “establish a research agenda that defines central issues of strategic importance for collective scholarly activity” (NCTM Research Committee, 2004, p. 74) is one example. The 1999 creation of the AERA Panel on Research (Cochran-Smith & Zeichner, 2005) is another. Both groups express an interest in strengthening empirical research on educational issues. So the timing is right for the recent publication of an 804-page paperback book entitled *Studying Teacher Education: The Report of the AERA Panel on Research and Teacher Education* (*Studying Teacher Education*). Comprising this book are analyses of major, peer-reviewed studies that support our understanding of what has been and still needs to be researched in teacher education. This review explores what the AERA Panel has to say to our community of mathematics educators and researchers.

With the overall goals of 1) making sense of what research does or does not say about teacher education and 2) crafting a new research agenda, *Studying Teacher Education* begins with a 36-page executive summary and ends with a final chapter presenting a research agenda for teacher education. Three general chapters provide the reader with a description of the methods used to select from empirical literature published since 1985. The synthesis of research on each major topic includes a discussion of the historical, demographic, and cultural context of the topic; identification, definition, and classification of research questions; brief summary of research findings; and recommendations for future research. At the end of each synthesis is a table listing specifics of the studies reviewed for the synthesis: the authors, date, main question or focus, research method and design, date and source of data collection,

descriptions of the participants, and impact of the research.

The AERA Panel carefully articulates the rationale for producing such a large volume. For example, they state that teachers are the most “significant factor in children’s learning and the linchpins in educational reforms of all kinds” (Cochran-Smith & Zeichner, 2005, p. 1). The Panel emphasizes that a major focus must be on recruitment, preparation, and retention of teachers and that partnerships among teachers and their colleagues from many fields are needed in order for research to inform practice and policy. The Panel acknowledges that the issues in teacher education are complex; there are disagreements about the purpose of schooling, disparate values and beliefs, and local and state limitations. Among their recommendations, the Panel notes the need for “more research on the impact of preparation in various subject areas on teachers’ performance and knowledge as well as on their pupils’ learning...in particular, we need research that disentangles the effects of programs from those of subject areas” (p.34).

Studying Teacher Education contains information useful for guiding the research of mathematics education students, focusing future research activity, and informing instruction. Because *Studying Teacher Education* is a contemporary collection of well-organized research syntheses, it provides an alternative to repeated searches in educational databases. The following are highlights of the research syntheses that appear most useful to mathematics educators.

Synthesis 1: Teacher Characteristics: Research on Demographic Profile (Chapter authors: Zumwalt, K., & Craig, E.)

The focus for this synthesis is on finding answers to who is going into teaching, how they are being prepared, and what entry and career paths are being followed. The most specific, and surprising, information relating to mathematics teaching from the research studies analyzed is that “yearly attrition rates for mathematics and science teachers are near average” (p. 139). The Panel notes a need for more research that explores teacher characteristics and attrition of teachers by school level, subject, race, and ethnicity, and years of service. The Panel also emphasizes the need to address the lag in the collection, release, and analysis of survey data that

Comprising this book are analyses of major, peer-reviewed studies that support our understanding of what has been and still needs to be researched in teacher education.

provide information about who is in the teaching pipeline.

Synthesis 2: Teacher Characteristics: Research on Indicators of Quality (Chapter authors: Zumwalt, K., & Craig, E.)

This chapter focuses on the relationships between teacher demographics and teacher quality. From the synthesis of 88 studies published between 1985-2002, the Panel notes that more research needs to be done to assess how the non-representative distribution of qualified teachers affects the achievement gap and to develop quality indicators that facilitate comparative research. Of specific relevance to mathematics education are data suggesting that less than one-half of mathematics teachers are highly qualified and that alternative routes of producing mathematics teachers do not necessarily produce more teachers with majors in mathematics. The Panel also points out that there needs to be more comprehensive research on teacher characteristics.

Synthesis 3: Effects of Coursework in the Arts and Sciences and in the Foundations of Education (Chapter authors: Floden, R., & Meniketti, M.)

In this chapter, more than half of the 40 studies cited indicate a positive link between students' mathematics achievement and their teachers' mathematics-related coursework. This synthesis clearly describes the criteria used to select the studies and the information presented about the studies has the potential to be directly or indirectly useful to other researchers, mathematics educators, administrators, and policy makers.

Synthesis 4: Methods Courses and Field Experiences (Chapter authors: Clift, R. T., & Brady, P.)

This synthesis addresses the outcomes of teaching methods courses and field experience. Of the 107 studies reviewed, approximately 20 focus specifically on mathematics. These studies were published between 1995 and 2002. Most of the research in this area was conducted by researchers studying their own students. Studies provided "little information about learning to teach secondary subjects such as geometry or algebra, or about how prospective teachers might be strong in one area and weak in another. The mathematics studies provided less information on the contexts or participant demographics than one would hope for when trying to understand the contexts in which teacher education is taking place" (Clift & Brady, p. 319).

Synthesis 5: Pedagogical Approaches in Teacher Education (Chapter author: Grossman, P.)

The main question directing this synthesis focuses on learning about the instructional

practices, strategies, and experiences used in teacher preparation. The Panel drew 39 studies into this synthesis. In general, the four studies that focus on mathematics explore the use of various video or multi-media materials in the practice, suggesting that more research in this area is needed to help inform mathematics educators. The Panel notes that there is a lack of common understanding or practice when exploring research in this area.

Syntheses 6 & 7: Preparing Teachers for Diverse Populations (Chapter authors: Hollins, E., & Guzman, M. T.) & **Preparing General Education Teachers to Work with Students with Disabilities** (Chapter authors: Pugach, M. C.)

There is little information in Syntheses 6 or 7 to guide the preparation of mathematics teachers to teach diverse populations and students with special needs, which is additional evidence of a critical need for research in these two areas.

Synthesis 8: Accountability Processes in Teacher Education & Teacher Education Programs (Chapter authors: Wilson, S., & Youngs, P.)

This synthesis is a must-read for those who are unsure of whether students benefit from having experienced or well-trained mathematics teachers. As in Synthesis 3, convincing evidence is presented in the descriptions of several studies that show student gains in mathematics achievement when students are taught by a fully certified, experienced mathematics teacher. However, Zeichner and Conklin acknowledge the "lack of success in finding empirical support for a particular model of teacher education at the preservice level" (p. 704). More research is needed to validate any such claims about exemplary teacher education programs.

Synthesis 9: Teacher Education Programs (Chapter authors: Zeichner, K. M., & Conklin, H. G.)

Two of the 38 research studies pulled into this synthesis offer information of direct interest to mathematics educators. These studies focus on comparing the attrition of alternatively certified mathematics teachers to traditionally prepared teachers, and on comparing the achievement of students who are taught by traditionally certified mathematics teachers with the achievement of students who are taught by alternatively prepared teachers.

Of particular interest to the mathematics education community are the Panel's recommendations for research. Among the recommendations is the call for research that connects teacher education to student learning. The Panel recommends, for example, research on preparing teachers to successfully teach students of diversity and

(Continued on page 14.)

Less than one-half of mathematics teachers are highly qualified and alternative routes of producing mathematics teachers do not necessarily produce more teachers with majors in mathematics.

A Review of *Studying Teacher Education*

(Cicmanec, continued from page 13.)

research on the recruitment of a diverse teaching force. The Panel believes that a national database on teacher candidates, teachers, and reserve pools would advance the research that is needed. They also recommend that the research on teacher preparation be conducted in various subject areas. As mentioned earlier, the executive summary and the final chapter of *Studying Teacher Education* provide excellent summary information.

Without a doubt, it is difficult for *Studying Teacher Education* to answer many of the questions that pertain to mathematics teacher education. (For example, the questions posed at the beginning of this review remain unanswered.) Although there are minor flaws in the organization (e.g., some tables are not organized alphabetically or chronologically), the report provides an invaluable overview of peer-reviewed research on teacher education. While the

Panel has offered summaries of research outcomes that all may not agree with, the Panel has been careful to articulate the limitations of these summaries, noting that “some of what are considered serious failings in the research on teacher education are more rightly understood as reflections of the field’s relative youth and of its history in terms of research priorities and resource allocation” (Cochran-Smith & Zeichner, p. 4).

Studying Teacher Education provides teacher educators with an excellent reference to existing research on teacher education and direction for future studies.

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(Zientek, continued from page 10.)

certification exams, recommendation for standard certification by the Blinn College TEACH supervisor, and renewal of their teaching contract.

Because teachers need subject matter knowledge and an understanding of how to impart this knowledge, a content course should be created that integrates content knowledge and teaching techniques. Without training from their certification program, traditional classroom methods will continue while “largely ignoring the processes of mathematics and the fact that mathematical knowledge often emerges from dealing with problem situations” (Thompson, 1992, p. 189). For the Blinn program, pre-calculus and probability concepts are emphasized with TexTEAMS material incorporated into the course. TexTEAMS is a professional development program based on the Texas Essential Knowledge and Skills that allows teachers to extend their knowledge, conceptualize content, and make connections between topics (Charles A. Dana Center, 2004).

The content course should be designed to include various teaching methods while at the same time providing challenging problems to ensure teachers master content knowledge. For mathematics teachers, discussions of appropriate uses of technology as established by NCTM (2000) should be integrated into the course. Prospective teachers should be assessed on content knowledge throughout the semester including on and off campus examinations. Follow-up sessions, administered by experienced teachers, should be

implemented in the summers to reinforce the application of learning theories in the classroom and to learn how to properly integrate the use of manipulatives in classroom instruction.

During teacher training, prospective teacher candidates need practice not only in assessing student performance, but also in providing constructive, meaningful feedback that is so critical to the improvement of knowledge and skills. Wiggins (2004) asserts, “there are fundamental misconceptions about assessment generally and feedback in particular among educators. As I have argued, far too many educators treat assessment as something one does after teaching and learning are over instead of seeing assessment as central to learning” (p. 1). In Blinn’s TEACH program, prospective teachers gain assessment knowledge prior to entering the classroom by assessing sample student exams, identifying misconceptions from completed mathematical problems containing common errors, and providing written feedback on how to address these misconceptions in the classroom.

Programs need to be developed that give prospective teachers experience prior to entering the classroom, support during their first years of teaching, along with pedagogy training and content mastery courses to provide new teachers with as much information, skills, and knowledge as possible to succeed in the classroom. As noted by Humphrey, Wechsler, and Hough (in press), research still needs to be conducted on how programs can better be adapted to meet a diverse group of teachers as well

(Zientek, continued from previous page.)

as how to strengthen program components that will increase teacher retention.

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October 26-28	SSMA	Missoula, Montana
November 9-12	PME-NA	Mérida, Yucatán

2007

January 4-7	MAA-AMS Joint Meeting	New Orleans, Louisiana
January 25-27	AMTE	Irvine, California
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March 19-21	NCSM	Atlanta, Georgia
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