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**Proceedings of the First
Annual Meeting of the
Georgia Association of
Mathematics Teacher
Educators**

October 17, 2007
Rock Eagle Center
Eatonton, Georgia

Georgia Association of Mathematics Teacher Educators (GAMTE)

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Submissions for GAMTE's Annual Conference Proceedings are peer-reviewed by the Proceedings Committee.

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Lynn Hart Georgia State University lhart@gsu.edu

Co-chair

Clara Nosegbe	Atlanta Public Schools	cnosegbe@gsu.edu
Linda Nash	Clayton State University	LindaNash@mail.clayton.edu
Denise Mewborn	University of Georgia	dmewborn@uga.edu
Marvin Smith	Kennesaw State University	msmit283@kennesaw.edu
Katheryn Fouche	Columbus State University	fouche_katheryn@colstate.edu
Deborah Gober	Columbus State University	gober_deborah@colstate.edu

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Purposes and Goals of GAMTE

The purpose of GAMTE is to encourage and facilitate the improvement of mathematics teacher education across the state of Georgia. The goals of the organization are to: facilitate communication and collaboration among mathematics teacher educators between and within all educational levels; coordinate activities and work collaboratively with other associations, organizations, and governmental (national, state, and local) units to strengthen the mathematical, pedagogical, and clinical preparation of mathematics teachers at all levels (P-college); facilitate collaboration among mathematics teacher educators who are members of different academic units, such as departments of mathematics and departments of education; promote leadership among mathematics teacher educators in the broader mathematics education community; encourage research related to mathematics teacher education, especially which identifies factors that contribute to improving the preparation and professional development of mathematics teachers at all levels; encourage and organize programs and meetings focusing in issues related to the preparation and professional development of mathematics teachers; and foster the incorporation of appropriate technology into teacher education programs and professional development opportunities in mathematics at all levels (P - college).

*Special thanks to the Department of Early Childhood Education,
Georgia State University for preparing copies of the proceedings*

Table of Contents

	Page Number
Abstracts	i
Preservice Teachers' Mapping Structures Acting on Representational Quantities <i>Günhan Caglayan, University of Georgia</i>	1
The Mathematical Preparation of Secondary School Teachers <i>Kelly W. Edenfield, University of Georgia</i>	17
Using Technology to Design Teaching Modules in Mathematics and Science <i>Ollie Irons Manley, Georgia State University</i>	28
Assessing Understanding of Multiplication through Words, Pictures, and Numbers <i>Marvin E. Smith, Kennesaw State University</i> <i>Stephanie Z. Smith, Georgia State University</i>	46
Change and Relationships in Elementary Preservice Teachers' Mathematics Pedagogical Beliefs, Teaching Efficacy Beliefs, and Content Knowledge <i>Susan Swars, Georgia State University</i> <i>Lynn Hart, Georgia State University</i> <i>Stephanie Z. Smith, Georgia State University</i> <i>Marvin Smith, Kennesaw State University</i>	62
The Kennesaw State University Mathematics Methods Model <i>Angela L. Teachey, Kennesaw State University</i>	80

Preservice Teachers' Mapping Structures Acting on Representational Quantities

Günhan Caglayan, University of Georgia, sezen@uga.edu

Abstract: *In this article, I write about my research on five preservice secondary teachers' (PST) understanding and sense making of representational quantities associated with magnetic color cubes and tiles. Data came from individual interviews during which I asked PST problems guided by five main tasks: prime and composite numbers, summation of counting numbers, odd numbers, even numbers, and polynomial expressions in x and y . My work drew upon an analysis framework (Behr et. al, 1994) supported by a unit coordination construct (Steffe, 1988) associated with linear and areal quantities inherent in the nature of figures produced by these PST. Linear quantities can be thought of as generated via linear measurement units (e.g., inches, centimeters, units) whereas areal quantities are generated via areal measurement units (e.g., square inches, square centimeters, square units, etc.) I used thematic analysis supported by constant comparison and retrospective analysis to explain my theories and hypotheses concerning PST's representational quantities. I developed a data analysis framework which I named "Relational Notation" to describe these PST's understanding of linear and areal units. PST also treated the quantitative multiplication and addition operations as some kind of functions, mappings, when expressing the area of their growing rectangles made of magnetic color cubes and tiles as sums and products. Their behavior necessitated the existence of another component for my data analysis framework which I called "Mapping Structures"*

The Mathematical Preparation of Secondary School Teachers

Kelly W. Edenfield, University of Georgia, kweden@uga.edu

Abstract: *In the summer of 2007, a group of doctoral students at the University of Georgia gathered to discuss the mathematical preparation of secondary teachers. The group used Mathematics for High School Teachers: An Advanced Perspective by Usiskin, Peressini, Marchisotto, and Stanley (2003) as the catalyst for the discussion. Participants agreed that future teachers need opportunities to examine high school and college mathematics differently from the way they had as students, with specific emphasis on connections, representations, and history. Features of this text that were highlighted in the discussions were the attention topics with commonly held misconceptions, the historical rationales and development of mathematical topics, and the role of mathematical definitions. Group members felt that, depending on one's purpose for using the text and the backgrounds of the prospective teachers, this text could be used, in conjunction with supplemental materials, in a variety of capacities: for a capstone course, a connections course, or a set of replacement mathematics courses.*

Assessing Understanding of Multiplication through Words, Pictures, and Numbers

Marvin E. Smith, Kennesaw State University, msmit283@kennesaw.edu

Stephanie Z. Smith, Georgia State University, ssmith@gsu.edu

Abstract: *The objective of this session is to engage mathematics teacher educators in a discussion of how to assess an understanding of the concept of multiplication as an operation and its relationships to other operations. The session will begin with a presentation of a previously published study assessing children's understanding of multiplication as grouping and the relationship between multiplication and addition. The assessment asked a series of problems involving words, pictures, and numbers. The results of the study indicate that the types of problems asked were successful in providing evidence of children's understanding of multiplication. The study also found that a group of third grade children had developed a better understanding of multiplication after just one multiplication unit from Investigations in Number, Data, and Space than a comparable group of fourth grade children had developed from an entire year of a traditional emphasis on memorizing multiplication facts. An interactive discussion of potential uses of this study and its assessment format in teacher education will follow the presentation.*

Using Technology to Design Teaching Modules in Mathematics and Science

Ollie Irons Manley, Georgia State University,
oimanley@gsu.edu

Abstract: *Technology is changing the way in which mathematics and science are taught, and this radical transformation in teaching is causing teachers to take a closer look at how lessons are designed. In an effort to demonstrate how to design instructional modules using technology, this paper will include the following: 1) A review of the National Educational Technology Standards for teachers to establish a framework for the development of the teaching modules; 2) instructional designs and techniques with special emphasis on multiple intelligence and critical thinking skills; 3) strategies and techniques for infusing technology into a standard based curriculum; and 4) an analysis of the evaluative data completed by pre-service teachers to determine the effectiveness of the modules. Middle and elementary pre-service teachers at a historically Black university are required to take a course, Integrated Methods of Teaching Science and Mathematics and the previously mentioned instructional modules were used in this course. The learning modules provided the pre-service teachers with technology enhanced experiences that were aligned with the national science and mathematics standards.*

Pre-service teachers were asked to complete five modules which included both formative and summative assessments. They were also asked to complete a survey to obtain their perceptions of the teaching strategies, their performance, the use of tools and assistance, and comfort with using the computer. The only statistically significant correlation ($p < .01$) was between performance and teaching strategies.

During the exit interview for the course, five of the pre-service teachers indicated that they liked the web-enhanced course and that it was good for their personal schedules; however, all the students had a concern about the required assignments and the amount of time required to complete them. All but one of the students indicated that they would take another web-enhanced course. Teaching modules that incorporate the use of technology are an excellent way to meet the learning needs of a diverse population

Change and Relationships in Elementary Preservice Teachers' Mathematics Pedagogical Beliefs, Teaching Efficacy Beliefs, and Content Knowledge

Susan Swars, Georgia State, sswars@gsu.edu; Lynn Hart, Georgia State,
lhart@gsu.edu;
Stephanie Z. Smith, Georgia State, ssmith@gsu.edu ; Marvin Smith, Kennesaw State,
msmit283@kennesaw.edu

Abstract: *This study investigated the mathematics beliefs and content knowledge of 103 elementary preservice teachers in a developmental teacher preparation program that included a two course mathematics methods sequence. Preservice teachers' pedagogical beliefs became more cognitively-oriented during the teacher preparation program with these changes occurring during the two methods courses. Pedagogical beliefs remained stable during student teaching. The preservice teachers also significantly increased their personal efficacy for teaching mathematics throughout the program with these shifts occurring across both methods courses and into student teaching. Pedagogical beliefs and teaching efficacy beliefs were not related at the beginning of the program, but, in general, were positively related throughout the program. In addition, the preservice teachers' pedagogical beliefs were positively related to their specialized content knowledge for teaching mathematics at the end of the program.*

The Kennesaw State University Mathematics Methods Model

Angela L. Teachey, Kennesaw State University,
ateachey@kennesaw.edu

Abstract: *Kennesaw State University's comprehensive, nine-credit-hour, methods course integrates general and mathematics-specific pedagogical training with a structured four-week field experience prior to student teaching. This course blends essential units on conceptual understanding of mathematics, lesson planning, assessment, classroom management, and diversity with mathematics-specific methods. All topics are aligned with National Council of Teachers of Mathematics standards and Georgia Performance Standards. Throughout the course, students complete a variety of assignments that require them to practice the skills highlighted in class readings and discussions, and they adapt and generalize those skills during their field experiences. Students have numerous opportunities in class and in the field to implement and to reflect upon pedagogical and assessment strategies and to receive feedback from course instructors, from other students, and from collaborating teachers. This intense course has many benefits and challenges for both the instructors and the students, but it is one of the most highly anticipated courses of secondary mathematics education majors at Kennesaw State University. With strong support of department administrators and the entire mathematics education faculty, this methods class has been quite successful in preparing the seniors for their student teaching experiences.*