

Curriculum Matters!
For students, for teachers, and for teacher educators

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INTRODUCTION

It is probably no surprise to many of you that I will speak this evening about curriculum. Curriculum has been a focus of much of my work and a primary driver for school improvement efforts, particularly over the past 25 years.

In fact 2014 is a perfect time to reflect on educational improvements driven by curriculum reform. This year marks the 25th anniversary of the publication of *Curriculum and Evaluation Standards for School Mathematics*.

Next year is the 50th anniversary of the passage of the federal Elementary and Secondary Education Act as part of President Lyndon Johnson's "war on poverty". The Act provides federal funding to states that establish high standards and accountability measures. Interestingly, it also specifically prohibits the establishment of a *national curriculum*.

In 2002 ESEA was reauthorized as the *No Child Left Behind Act*. NCLB set 2014 (this year) as the year in which ALL students were to be "proficient" in reading in mathematics.

So, it seems fitting at this time to reflect on progress made and to consider the current context of curriculum reform efforts represented by the *Common Core State Standards initiative*.

I began my academic career in 1985 when the writing of the NCTM *Curriculum and Evaluation Standards* was initiated. Based on the work of individual members, key leaders, and several committees of NCTM, in 1984 the Board of Directors appointed a task force led by Jim Fey that eventually provided a foundation for the NCTM Standards project. In a summary of the history of the development of NCTM's standards, Doug McLeod provides an artifact of the beginnings of the standards – a hand written note by Jim Fey (McLeod, 2003). This sketch is a pretty good representation of what followed.

Some of the “more senior” mathematics educators in the audience may recall, as I do, using the “brown paper cover” version of the DRAFT NCTM standards, released in 1987. That document, and the other NCTM Standards documents that followed, set forth a vision of mathematics education that prioritized conceptual development, reasoning, problem solving, and active student engagement in learning.

Not long after the release of the NCTM Standards in 1989, the National Science Foundation stimulated the development of what was called “standards-based” curriculum materials.

Much of my career has been shaped by these events – the articulation of standards or learning goals and the development of curriculum materials aligned to the vision of the NCTM Standards. For the past 25+ years we’ve witnessed and participated in curriculum reform efforts that were designed to improve student-learning opportunities.

I believe the NCTM Standards and the emphasis on student engagement, conceptual development, and problem solving has had a significant and positive impact on U.S. education. It certainly influenced my thinking about teaching and student learning and I suspect it also shaped much of the work and thinking of members of this audience. Indeed, many of us are still striving to enact this vision as we work with future and inservice teachers.

I also believe that NCTM’s curriculum reform efforts have contributed to increased student learning. Since 1990, the rising level of student performance on national measures such as the ACT, SAT, and NAEP are evidence of the success of the reform efforts – much of which was initiated by NCTM.

For those who’d like to review a more complete discussion of the steady rise in national measures of student achievement (despite what the media and many politicians say about the decline of American public education), I encourage you to read a thoughtful presentation of the NAEP data by Pete Kloosterman & Crystal Walcott in the 2010 NCTM Yearbook. I’ll simply reiterate here their claims that much of the increase in student opportunities to learn, in the curriculum students are offered, and in student performance in mathematics – can be attributed to the NCTM-inspired curriculum reform efforts. In a separate paper published this year, Zalman Usiskin (2014) describes data from NAEP as well as other measures including the SAT. His conclusion is that, at all grade levels, U.S. students have substantially higher scores than their peers of a generation ago.

There is still much work to be done - particularly in raising performance across different student ethnic and socio-economic groups. Even among high performing schools – updating the curriculum and creating an atmosphere that engages and interests students in studying mathematics should continue to be a major focus of work. There are far too many students – in all types of schools – who are not interested in mathematics and do not see its relevance for their future.

Today we find ourselves once again returning to a reform agenda that is based on curriculum – in this case, the *Common Core State Standards* initiative – begun not by NCTM but instead

by a consortium of state governors. Intended as a starting point – a set of common mathematics learning goals – it has recently become a lightning rod for unproductive and distracting conversations about school mathematics (much like the NCTM Standards became a focal point for controversy years after its publication).

My goal in this presentation is to provide a status report regarding the Common Core, identify some open questions that need our attention, and finally to challenge us, as mathematics teacher educators, to consider our own role in supporting teachers and students engaged in implementing curriculum reform.

CCSSM AS A CONTEXT FOR REFORM/IMPROVEMENT

Since the passage of ESEA in 1965 policy-based efforts to improve the K-12 educational system in the U.S. and promote increased student learning in mathematics have employed a “standards-based” reform strategy.

When educational policy researchers use this term, they are not necessarily referencing NCTM Standards or the NCTM vision of school mathematics. Instead, they refer to a reform agenda that, according to Goertz, seeks to “establish clear goals for student achievement through the establishment of standards and related assessments, generate data to improve teaching and learning, create incentives for change through rewards and sanctions, and provide assistance to low-performing schools” (Goertz, 2008).

Confrey and Maloney (2011) describe standards and high-stakes assessments as policy-imposed “bookends” of a reform strategy designed to stimulate change. In this system, success is defined by the extent to which student scores on assessments based on the standards increase and eventually match or exceed international benchmarks.

What happens between the bookends of this policy-imposed system is the hard work of teachers and educational leaders in designing, and implementing instruction and organizing mathematics education systems that support student learning of mathematics. Key features of the “internal” work (central column) of a standards-based accountability system are: instructional practices and curriculum materials that teacher’s use to engage students. These internal features are highly dependent on the knowledge and skills of teachers and are influenced by the nature and extent of their initial and ongoing professional development (the primary work of teacher educators).

The standards-based reform strategy, which characterizes and was fueled by the reauthorization of ESEA in 2001 (called No Child Left Behind), was and remains very much a state-based initiative. It initially led to each of 50 states having their own set of grade-specific standards, their own aligned assessments, and their own proficiency targets – with the common goal of elevating all students to proficiency by 2014 (this year!).

Although the NCTM Standards were, in many cases, the starting point for the creation of state-level standards, the resulting grade-by-grade learning goals differed – sometimes dramatically. One result was the publication of state-specific textbook editions to

accommodate the standards of large state adoptions, such as California, Florida, and Texas. In other cases, lessons were added to existing textbooks to accommodate state-specific requirements/standards.

It is my belief that the differences across state standards (and related assessments) regarding **what** to teach and **when** to emphasize particular mathematics topics practically guaranteed large textbooks with superficial attention to many topics and lead to textbooks that were not only “a mile wide and an inch deep” but, along with supplemental material, also “a foot tall.”

To illustrate:

In 2007 – well before the development of the Common Core – my colleagues and I examined the fourth grade learning goals (standards) of the 10 largest states in the U.S. (Reys, et al., 2007) We compiled the learning goals from these states, identifying 108 unique goals for grade 4 across these 10 states. So, for grade 4, a textbook author would need to attend to 108 unique learning goals in order to align with standards in just these 10 states!

We then looked for what was common in the list across the states. At the extreme end, only 4 of the 108 standards were, in fact, common across all 10 states. These 4 common standards included: *read, write, compare, and order whole numbers.*

Perhaps more surprising were the large number of standards (28 of 108) that appeared in only one of the ten states. Examples included: *Use concrete materials and symbolic notation to represent numbers in bases other than base ten, such as base five.*

While we examined in detail just one grade level (grade 4), it was clear that although the states had used NCTM Standards as a general guide, there was no substantial common curriculum by grade across the states.

This is one of the problems that the Common Core was intended to address. The idea was for states to collaborate in establishing rigorous standards that were based, when possible, on current understanding of student learning and development, and prepare all students for college and/or careers that provide an adequate standard of living. With consensus on a common set of standards AND high quality assessments that are aligned to the common standards, teachers, curriculum developers, and educational leaders could focus their attention on supporting student learning. That is, we could focus on **teaching and learning**, the central column of the reform strategy.

Although the Common Core is not perfect, it has some positive features and is, in my opinion, a stronger, clearer, more focused and coherent set of standards than was the case of many (most) state standards. I believe the Common Core represents an improvement over many state standards in several key areas:

First, it recognizes the importance of conceptual development and student understanding. This may seem obvious but I recall not too long ago that in some states the term

“understand” could not be used in standards documents because it was believed (assumed) that one could not assess understanding. According to Zalman Usiskin, there are 265 instances of the word “understanding” or “understand” in the Common Core. These standards have certainly given us license to both focus on conceptual development and assess student understanding.

Second, the Common Core prioritizes the development of mathematical practices. While the content standards dominate the document, the Common Core, like the NCTM standards, make it clear that the development of problem solving and reasoning are bedrocks of a strong mathematics education.

To be honest, I would have preferred that the Common Core not generate yet another list of important process or practice goals. I think we have adequate lists and perhaps better articulations of the processes and practices we see as a central goal of mathematics programs in the form of the NCTM process standards, the proficiencies identified in the NRC document, *Adding It Up*, and in the habits of mind described by Cucuo, Goldman, and Mark (1996). However, the inclusion of the mathematics practices in the Common Core is a clear sign that there is consensus on a complete mathematics education being more than a set of skills, formulas, and algorithms – that thinking is essential!

A **third** strength of the Common Core is that, at least in some cases, the content standards are based on learning progressions that are derived from research on student thinking and development.

Of course, there is room for improvement in the Common Core. While some of the standards learning progressions are both thoughtful and thorough, others are incomplete or based on best guesses rather than research evidence. And there is expertise within the mathematics education community to improve the progressions. Indeed, several research groups have begun to discuss improvements.

To illustrate, I reference here the work of a group of CSMC scholars under the leadership of Jack Smith. Jack’s group took on the task of a careful review and critique of the measurement strand of the Common Core. In a thoughtful review, the group identified several areas that will require attention in the next iteration of the Common Core. A quick look at one topic will illustrate. In grade 5 of the Common Core, volume is a focus of attention – what it is and how it can be measured. The progression begins with a focus on the conceptual basis for volume. However, the progression beyond this initial standard is spotty. In grade 6 the emphasis is on working with fractional side lengths and applying a formula. In grade 7 and 8, the expectation is for students to find the volume a cone, cylinder, and sphere. Unfortunately, there is no explicit emphasis within this progression on the importance of understanding and using relationships among these solids to develop and/or use volume formula. For example, that the volume of a cone is related to the volume of a cylinder or sphere with similar dimensions.

Again, this progression can certainly be fixed if there is a process, at some point in the future, for making improvements.

In my opinion, the Common Core also falls short in several areas including:

- recognizing that technology is and will continue to change what mathematics students should know and how they might learn some mathematical ideas.
- providing clear guidance at the high school level regarding the organization and integration of content.

There also remain some big OPEN questions regarding the Common Core.

The biggest unknown is whether the Common Core initiative will deliver on the promise of high quality aligned assessments to monitor student learning. And, as I said, we have yet to establish a plan for ongoing maintenance and improvement of the Common Core. Are high quality curriculum materials available to teachers? Will the new Common Core aligned assessments be affordable, of high quality, and useful for more than simply measuring progress?

IMPLEMENTATION OF CCSSM – STATUS REPORT

Now for a brief look at where we are in the implementation of the Common Core.

Based on our own experience with the NCTM curriculum reform effort of the past 25 years, we know that changing school programs and classroom practices is not easy. Change such as this gets the attention of many people outside of schools including parents, community leaders, and politicians. As Woodrow Wilson once noted, “It is easier to change the location of a cemetery, than to change the school curriculum.” While he was referring to the college curriculum, I believe that the statement is equally true of the K-12 mathematics curriculum.

What we’ve witnessed outside of schools over the past three years, since the rollout of the Common Core, are mixed messages, confusing rhetoric, and a pattern of misinformation. Headlines associated with the Common Core signal some of these themes. [Show] It would be funny if it were not so important!

Recall that the initial response to the Common Core was positive – many states adopted the Common Core very quickly, with few modifications, and the general public thought common curriculum standards made sense. Once the initial enthusiasm subsided and the hard work of implementation began, support for the Common Core has eroded among some constituent groups including segments of the general public.

In addition, some educators, including mathematics educators, were critical from the start.

I believe it is important to distinguish between these two very different streams of concern. They can be characterized in the following way:

- [Some segments of the] General public – There is a general fear of federal control or loss of local autonomy regarding K-12 education. The assumption seems to be that something

supported and/or influenced by the federal government can't possibly be as good as what is done locally. I view this stream of opposition as very political – and I've found that it is difficult to change opinion because the argument is emotional and based on values and a general philosophy of governance rather than on the substance of the Common Core. In these arguments, we hear statements that are often based on misinformation. For example, some believe that the Common Core:

- is a national mandate dictating a national curriculum.
 - dictates what textbooks teachers will use.
 - includes controversial science curriculum.
 - controls the curriculum of charter schools, private schools, religious schools, Catholic schools and homeschooling.
 - are an intrusion of student privacy rights and will allow student data to be inappropriately tracked.
- Education community – Among educators there is also some dissatisfaction with the content of the Common Core and/or the pace of implementation; cost of implementation; unknowns related to assessments associated with the Common Core; and fear that the Common Core will stifle/limit curriculum innovation and experimentation. This stream of concern is not as loud or as well disseminated but it is just as real. It is the sort of dialogue we NEED in order to improve the standards-based reform effort.

While I worry about these issues, I support the implementation of Common Core because I believe that a common set of learning goals can lead to more focused and coherent curriculum materials and higher quality assessments, and therefore allow us to focus our attention on **teaching and learning**.

So, how is the Common Core being received by key constituents?

According to a recent Gallup Poll of public opinions regarding education,

- About two-thirds of Americans have not heard of the Common Core.
- Among the third who have heard of the Common Core, about four in 10 said the standards can help make education in the United States more competitive globally; a slight majority of this group said the standards will make the U.S. less competitive or have no effect.

So, 6 out of 10 of the third who have heard about the Common Core are worried (that's less than 20 percent).

It is interesting to note that in prior surveys, the public was generally positive about Common Core and agreed that common standards were a good idea. I suspect that recent opinion polls are influenced by the dominant theme of news reports about Common Core – that is, headlines in media outlets reporting opposition.

On the positive side, the recent Gallup Poll of public opinions also found that:

- Americans think that critical thinking skills are the most important of the 21st-century skills, closely followed by communication skills.

What about state agencies – the early and consistent supporters of the Common Core?

According to a survey conducted by the Center on Education Policy, state agency personnel agreed or strongly agreed that the Common Core in mathematics and English/language arts are more rigorous than their state's previous standards. They also agree or strongly agree that implementing the Common Core will require substantially revised curriculum materials. And they are generally not concerned about the current political backlash to the Common Core.

However, there is a strong and persistent effort to modify or reverse the adoption or delay implementation of the Common Core in some state legislatures. In 2013 alone, 14 state legislatures considered resolutions or bills to delay or stop implementation of the Common Core. The particular legislation differs by state, however there are some common themes ranging from “de-adopting the Common Core” to blocking funding for implementation. Many of these initiatives have been driven by a few well-organized political action groups. Most of this legislation, to date has failed to pass.

However, as of the end of 2013, two states (IN and WI) passed legislation to “delay implementation” until more information regarding the content and costs of Common Core are gathered. Other states such as FL, UT and MA are delaying or reversing their support for the Common Core assessment consortium, choosing instead to create their own Common Core-aligned assessments. Still others such as MI are, at least temporarily, cutting off state funding for implementation of the Common Core. Most recently some states including Arizona and Florida are renaming their state document, removing “common core” in order to deflect some of the criticism.

I suspect that these issues will continue to be discussed and debated in state legislatures throughout 2014. Having personally testified at several state legislative hearings, I believe that legislatures do want what is best for schools and children. My disappointment with legislative action is not with regard to the debate between federal and local control of educational issues. Rather, what disturbs me most is what appears to be a lack of trust of the judgment and recommendations of teachers and school administrators within the state.

What about teachers – the key implementers?

In a recent survey conducted by our own Jeff Choppin, Jon Davis, Core Drake, and Amy Roth McDuffie, middle school teachers agreed that the Common Core content standards are more rigorous than their previous state standards. They perceive the Common Core as requiring them to teach more conceptually and incorporate more communication, problem solving, and exploration. A majority of teachers agreed that new Common Core-aligned state assessment and evaluation systems WILL influence their instructional practices.

In addition,

- Slightly over two-thirds of the teachers surveyed are using textbooks that were adopted prior to implementation of the Common Core.
- One-third of teachers indicated a need for more support in implementing the Common Core Content Standards and Standards for Mathematical Practice, including better-aligned curriculum materials.
- In the absence of these materials, just over 60% of the surveyed teachers are regularly accessing online resources to supplement their existing textbooks and others are creating their own curriculum materials.

WHAT'S NEEDED?

To be successful, the Common Core and aligned assessments must be partnered with **content-rich curriculum materials and focused, ongoing professional development focused on improving teaching.**

Given the changes in emphasis and grade placement of key mathematics concepts and the renewed focus on development of mathematical practices, there is an immediate need for new curriculum materials yet state resources continue to be limited and many schools are not in a position to purchase new textbooks.

It is also the case that new formats and textbook delivery options are emerging including electronic textbooks and internet-based venues for archiving and delivery of content. In fact, some states are encouraging schools to explore and use open source online curriculum materials – in part because they are low (or no) cost and in part because these materials claim to be Common Core aligned.

These factors are contributing to some strong trends with regards to curriculum material development and use:

First, teachers are increasingly drawing upon materials from sources outside their district-adopted textbook to organize instruction. They report doing so in order to align their program to Common Core. In response to the Common Core, several foundations, professional organizations, and state educational agencies have sponsored projects to create and provide supplementary, internet-based instructional materials (individual lessons, units of instruction, or model curriculum). Other groups and individuals have assisted teachers in locating curriculum materials specifically related to the content of Common Core. For example, you can google a Common Core standard by number (e.g., 5.MD.3a) and be directed to multiple sites for “lessons” related to that CC standard!

A **second** trend regarding curriculum materials is the move by some schools and districts to provide e-tablets to all students. School administrators see the use of e-tablets as a way to enrich the technology experience of their students while providing access to current, constantly updated, curriculum resources.

Textbook publishers currently offer digital textbook format options so that students (and parents) can access school curriculum via the internet (without taking their textbooks home).

Twenty-two states have changed their definition of textbooks to include digital content (Fletcher et al., 2012). Some states, including California, mandate that textbook publishers make available online versions of their textbooks. Florida requires that districts spend half their instructional-materials budgets on digital content by 2015-16. (Davis, 2013)

I think this trend will continue to the point that in the not-too-distant future, traditional hardbound mathematics textbooks may no longer be found in U.S. classrooms. Instead, student laptops or e-tablets will provide access to instructional resources for both teachers and students.

We need to remind ourselves that what we've always called "textbooks" don't really have to be TEXT and they don't have to be BOOKS!

Like other technological innovations, the digital delivery of curriculum resources has the potential to strengthen student-learning opportunities. There is also the potential to simply deliver low-quality learning experiences to students via a high-tech medium. As always, the evaluation of any curriculum material should be based on the quality of experience it provides the learner – are rich tasks the basis of the material? Are students challenged and supported in their learning of important content? Are their explicit connections across mathematical ideas and are activities structured to help students see these mathematical relationships?

As Jeremy Roschelle warns,

*A digital textbook is **not** just taking an image of a [print] textbook and putting it on an electronic device to read it. A digital textbook is [should be] something that takes school content and takes advantage of the properties of digital media to produce that school content in a completely new way that's much stronger for learning.*

The good news is that there are individuals, curriculum development teams, and innovative tech companies currently developing digital resources and platforms that take full advantage of the power, flexibility and adaptability of technology to deliver lessons, problems, activities and other material for use by teachers and/or students. What we need are reasonable and effective ways to evaluate curriculum materials in whatever format they are available.

We must also work with teachers to study the progressions of key topics within the Common Core, collaboratively plan for the development of the mathematical practices, and build instruction that engages students in the study of important mathematical ideas outlined in the Common Core. Perhaps the biggest threat to the success of the Common Core Initiative as an improvement strategy is the lack of national attention and will to quality ongoing teacher

development. Unless we find ways to support teachers in their efforts the curriculum reform strategy won't be successful.

Although I have not focused in this talk on the assessments that are part of the Common Core initiative, that is not because of their lack of importance. I've not been involved in the consortia assessment work so I can't speak authoritatively about what is to come, both this year and next. However, I do want to point out several questions that we want to pay attention to regarding any assessments designed to monitor student learning of the Common Core. For example

- Will the state consortia assessments (PARC and SBAC) deliver on the promise of monitoring both mathematics content and practices?
- Will the cost of new consortia assessments (generally higher than states have allocated), inhibit their use?
- How will initial consortia assessment results impact perceptions and willingness to continue with the Common Core initiative?

I believe that the Common Core gives us, as mathematics educators and as teacher educators opportunities to support teachers and student learning. If the initiative is to do this, we must contribute to productive efforts including:

1. Ensure that the Common Core is a living document – one that will be revised/updated and strengthened on a regular basis as more is learned about student learning of important mathematics ideas.
2. Ensure that the Common Core, as implemented and as assessed, keeps the promise of BOTH career and college readiness.
3. Adapt and create materials that capitalize on present and emerging technologies to support implementation.
4. Promote research-based opportunities for teacher learning.
5. Ensure the content and quality of the Common Core-aligned assessments.
6. Support research to monitor and learn from implementation of the Common Core.

ROLE OF MATHEMATICS TEACHER EDUCATORS

Finally, I want to talk a few minutes about our role, as mathematics teacher educators, in preparing teachers for curriculum-based improvement efforts. That is, I want us to consider the emphasis on “curriculum” in our teacher preparation programs.

What is the “curriculum” of curriculum in our preservice teacher education courses?

Deborah Ball and her colleagues have provided important leadership in describing many key components of preparation for mathematics teaching. One component of the mathematical knowledge for teaching (MKT) framework that doesn't get enough attention, in my opinion, is “knowledge of curriculum.”

Shulman describes this component as “Curriculum knowledge, with particular grasp of the materials and programs that serve as ‘tools of the trade’ for teachers.”

Curriculum knowledge certainly includes knowing well the mathematics content that our preservice teachers will teach. We have help from the CBMS MET2 document to modify and align our mathematics content courses for preservice teachers to the Common Core. But I think there is more we must do. As mathematics teacher educators, we need to consider the methods courses and internships for future teachers - specifically, with regard to “Knowledge of Curriculum.”

In my opinion, this component should include attention to:

- Curriculum governance – the processes and policies related to articulation of the intended curriculum
- Curriculum standards and learning progressions embedded within the standards
- Curriculum resources - problems, tasks, sequenced lessons as well as lesson construction.
- Alignment of standards, materials, assessments

I’d like to suggest several key questions related to each area. My goal here is to help you think about what you currently attend to within methods courses for teachers and what modifications you may need to make.

With regard to curriculum governance, our preservice students need experiences that help them understand how the following questions get answered:

- *What mathematics should students learn and when should it be a focus of instruction?*
- *Who decides and what evidence (or values or orientations) inform these decisions?*
- *What is the federal, state, district, and school role in curriculum guidance/governance? Individual teacher role?*

Likewise, our preservice teachers need lots of experiences related to understanding the intended curriculum as outlined in standards documents including progressions of key content embedded within the standards:

- *What are the big ideas and emphasis for students in particular grades or across a span of grades?*
- *How do these mathematical ideas/topics develop over time?*
- *What variations in development of understanding and proficiency might be expected? In what ways can teachers support learners at different points in the learning progression?*

Another important area of study is curriculum resources .

- *What tools and resources are available to support teaching (and learning) of key mathematical ideas?*
- *How do curriculum materials differ?*

- *What are key features or characteristics of worthwhile mathematics tasks, activities, and/or lessons?*

Our students should also have a general understanding of what it means for curriculum to “align.”

- *What does it mean for learning goals, materials, and assessments to be “aligned.”*
- *How do teachers evaluate the alignment of goals, materials, and assessments?*

I’m sure others in this audience can improve upon the list and the questions that I’ve noted here. In fact, I challenge AMTE members to think about the *curriculum of curriculum* in their teacher preparation program, particularly at this time when curriculum is playing such an important role in school improvement efforts.

CLOSING

In closing, let me emphasize that while I believe high quality curriculum is necessary for a strong mathematics education program, it is by no means sufficient. Many things MATTER. These include:

1. Knowledgeable, well-supported **teachers**.
2. **Teaching** that engages students.
3. High quality **curriculum**.
4. **Student** attitude, beliefs, work ethic.
5. School leadership and parental support.

All of these things matter and the absence of any one of them can jeopardize student learning experiences.

Given the current focus on curriculum I hope AMTE members will be engaged in supporting teachers and schools in the implementation of the Common Core. I encourage you to:

- Study it, identify areas of strength, and help teachers (preservice and inservice) enact instruction that builds on these strengths;
- Discuss (with colleagues and teacher leaders) the challenges of implementation and develop ways to support teachers in overcoming these challenges.
- Engage in professional dialogue with other mathematics teacher educators to share ideas and resources for supporting curriculum study in pre and inservice teacher development.

Again, I want to thank the AMTE Board, the Conference Program Committee, and Judith Jacobs for this opportunity to speak tonight.

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