

# Journal of Mathematics Teacher Education in Texas

Online Journal of the Association of Mathematics Teacher Educators in Texas

Using STAAR Questions in an Online  
Mathematics Course for Preservice  
Elementary Teachers

*Gwendolyn Johnson*

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Tasks for Teachers: Approaches to the  
Design of Tasks for Preservice and  
Inservice Learners

*Rachael M. Welder, Dana Olanoff,  
Jennifer M. Tobias, Neet Priya Bajwa, Eva  
Thanheiser*

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## President's Message

Sarah Smitherman Pratt

Let's start with some celebrations! This is the 12th year of AMTE-TX, and our organization remains a strong and vital group. AMTE-TX hosted a virtual business meeting in July, and we had over 25 members join the conversation. Also, a new and fun activity now hosted by AMTE-TX is a monthly "Tea-Time" to connect mathematics teacher educators from around the state. If you have not yet made it to one, please make plans to join in the future. It is fun for us to continue to find ways to connect with each other.

In addition to these activities, let's celebrate some of our past presidents who are serving as officers in national organizations: Trena Wilkerson, National Council of Teachers of Mathematics (NCTM) President (2020-2022); Sarah Quebec-Fuentes, AMTE Treasurer (2019-2022); Dusty Jones, AMTE Vice President for Communications & Outreach (2019-2022); Colleen Eddy, AMTE Associate Vice President for Conferences (2019-2022) as well as Research Council on Mathematics Learning (RCML) Interim Secretary (2020-2021). Currently, I am serving as RCML Vice President for Conferences (2018-2022). We know many members also serve in various capacities in professional organizations, and we applaud all!



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## President's Message

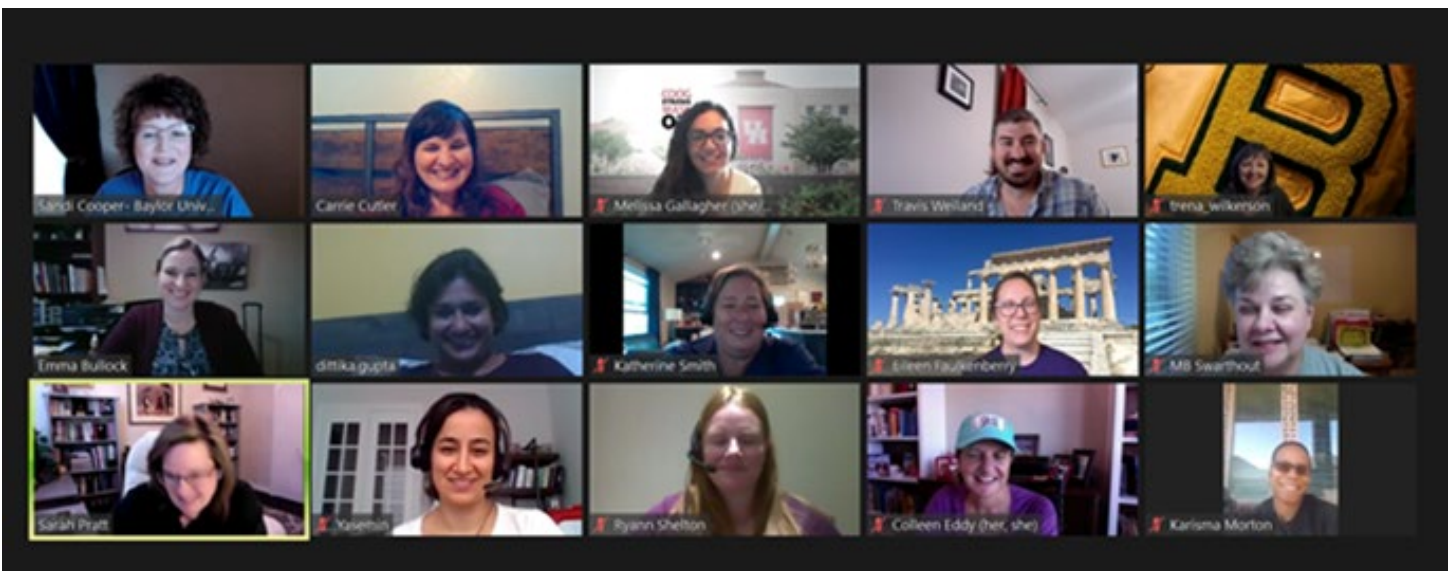
The last round of applause goes out to our newly elected officers: Priya Prasad, Treasurer, and Carrie Cutler, Vice President for Advocacy. Also joining our leadership team: Jamaal Young, Social Media Specialist; Kathy Horak-Smith, Photographer/Historian; and Yasemin Gunpinar, co-editor for *JMTET*. Thank you all for your willingness to serve AMTE-TX. The AMTE-TX Board invites members interested in serving to please contact any AMTE-TX board member. Our organization depends on its members to assist in continuing to keep us going.

As we look to 2021, we are making plans for more Tea-Time, the Annual AMTE Conference, and the AMTE-TX Fall Conference. Mark your calendars:

- January 29: AMTE-TX Tea-Time *and* AMTE Affiliate Meeting
- February 11-13 and 18-20: Annual AMTE Conference
- March 5: AMTE-TX Tea-Time
- April 30: AMTE-TX Tea-Time
- May 21: AMTE-TX Tea-Time
- June 11: AMTE-TX Tea-Time
- September: AMTE-TX Fall Conference

Though we have yet to determine if the Fall Conference will be held in San Antonio or virtually, we know that the conversations we will have will encourage and inspire us. This AMTE-TX community is amazing, and we have so much for which we can be grateful.

Lastly, please look for upcoming announcements regarding the Outstanding Service Award, President's Council Award, and Travel Awards (for graduate students and early career or new-to-state faculty). Our website continues to have updated information on important events and information. Also follow us on Facebook and Twitter. I hope to see you all at our next Tea-Time!



Screen shot from AMTE-TX Tea-Time on October 16, 2020.

# A Message from the Co-Editors

Greetings, Texas Mathematics Teacher Educators!

We hope that you and your loved ones are doing well, and we hope everyone's semester has ended well. We know everyone has gone through many challenges in their personal and professional life due to the COVID-19 pandemic. We would like to share Mevlana Celaleddin Rumi's seven advices that support us mentally and emotionally during these challenging times. "In generosity and helping others, be like the river...In compassion and grace, be like the sun...In concealing others' faults, be like the night...In anger and fury, be like the dead...In modesty and humility, be like the earth...In tolerance, be like the sea...Either appear as you are, or be as you appear."

Despite these challenging times, our community keeps developing excellent teaching practices and conducting exemplary research studies. In this issue, we are pleased to share a message about teaching during the pandemic by Gwendolyn Johnson of UNT Dallas and a summary of a 2020 AMTE conference presentation by Rachael Welder of Texas A&M University and a national team of mathematics teacher educators. Thanks to all of these authors for their efforts to support mathematics teacher education in Texas!

We'd love to hear what you have been doing in your own research and practice as mathematics teacher educators. If you have something to share with our community, whether an innovation in a course or program for mathematics teachers, progress from an ongoing research project, or a suggestion about how we can support AMTE's commitment to equity and effective practice, please consider submitting a four-page manuscript for an upcoming issue of *JMTET*! Submission instructions can be found at our journal's homepage, <https://amte-tx.com/online-journal-2/>.

The fall semester is done, and we're looking forward to the spring. We hope everyone's spring semester gets off to a safe and productive start.

Best wishes,  
Cody Patterson and Yasemin Gunpinar  
Co-Editors, *Journal of Mathematics Teacher Education in Texas*



## Call for Article Submissions

How does your teacher preparation course or program address key facets of mathematical knowledge for teaching? Manuscripts may address some of the following issues:



- Innovative approaches to developing deep understanding of mathematical concepts in the K-12 curriculum
- Understanding diverse learners and the social and political contexts of teaching
- Bridging between content and pedagogical knowledge

Submit manuscripts **by March 1, 2021**.

Guidelines: <https://amte-tx.com/wp-content/uploads/2020/05/jmtet-submission-guidelines-f.2019.pdf>

# Inspiration from Our Community: Adapting to Mathematics Teacher Education in the Era of COVID-19

## Using STAAR Questions in an Online Mathematics Course for Preservice Elementary Teachers

Gwendolyn Johnson, University of North Texas at Dallas

I taught my first online course during the summer of 2020, a Geometry and Measurement content course for future elementary school teachers. I did not want to teach online as I have spent years developing the course to be taught in person, but I quickly figured out how to use Panopto and Zoom, and I made it through the five-week course. I then learned that my university had decided to remain online for the entire 2020-2021 academic year. I knew that instead of simply surviving the next two semesters, I needed to create a better online learning environment.

Many of my students have low self-efficacy regarding mathematics. Some of them seem afraid to try because they are convinced that they will not understand the material. When we are on campus, they have my support and the encouragement of their peers. However, my classes were scheduled to be taught asynchronously, so I needed to find a way to overcome students' lack of confidence by creating assignments that would help my students learn without the in-person assistance that they receive during a typical semester.

When I teach courses on campus, one of the techniques I use is having future teachers discuss released STAAR questions in small groups. I create discussion prompts with the goals that group members will a) learn the mathematics in the STAAR question, b) develop the ability to predict mistakes that children might make. In released STAAR questions, many of the incorrect answer choices are based on common mistakes. By considering the incorrect answer choices, future teachers can learn to predict mistakes.

In transitioning to online instruction, I wanted to retain these goals and continue to use released STAAR questions, but I knew that some of my students would find the questions challenging. Although students have the opportunity to ask me questions during online office hours via Zoom, they might be reluctant to ask an instructor they have never met in person. Thus, in creating new assignment questions, I wanted students to feel confident that they knew the correct answer to the STAAR question, so that they could confidently comment on the other answer choices. I discovered a simple solution: instead of asking students to come up with correct answers, I now ask them to explain why other answers are incorrect, as in the example below:

Consider the fifth-grade STAAR question below:

*Oneesha swims a total of 13 kilometers each week. What is the total number of meters Oneesha swims in 3 weeks?*

- A. 39 meters
- B. 13,000 meters
- C. 3,900 meters
- D. 39,000 meters

- a) If a student answers A, what mistake did he probably make? What should he have done differently?
- b) If a student answers B, what mistake did she probably make? What should she have done differently?
- c) If a student answers C, what mistake did he probably make? What should he have done differently?



This task structure removes the pressure for students to identify D as the correct answer. Knowing the correct answer to the STAAR question reassures students that they are on the right track. At the same time, the assessment item helps me gauge students' understanding of the metric system and their ability to "think like a teacher" in comprehending student mistakes.

Helping future teachers gain confidence while they learn mathematics content is important in both face-to-face and online courses. Students in online mathematics courses face the dual challenge of adapting to an online environment and learning mathematics that they may find challenging. Having students explain why some answer choices are incorrect instead of coming up with the correct answers themselves may be one way to relieve some of the pressure. As one student commented, "I think the additional questions help a lot into figuring out what mistakes a student can make and how we can help make sure they don't make them. Those questions even helped me out when doing the assignments so I think it's good to include them."

## Upcoming Conferences

*All scheduled conferences are subject to possible rescheduling, format change, or cancellation as our colleagues work to keep our communities safe. We will provide updates in future issues as we learn of new developments.*

January 6–9, 2021	Joint Mathematics Meetings	Virtual
February 11–13, 2021	AMTE Annual Conference	Virtual
February 18–20, 2021	AMTE Annual Conference	Virtual
February 17-19, 2021	NCTM Regional Conference	Baltimore
February 25–27, 2021	RCML Conference	Virtual
March 25-27, 2021	NCTM Regional Conference	Dallas
April 19–21, 2021	NCTM Research Conference	St. Louis
April 21–24, 2021	NCTM Annual Meeting	<b>CANCELLED</b>
June 2–6, 2021	PMENA Conference	Mazatlán
June 21–23, 2021	TODOS Conference	Virtual
July 19-21, 2021	CAMT	Houston
September 22–25, 2021	NCTM Annual Meeting	Atlanta
October 27–29, 2021	NCTM Research Conference	Phoenix

## Tasks for Teachers: Approaches to the Design of Tasks for Preservice and Inservice Learners

Rachael M. Welder  
Texas A&M University

Dana Olanoff  
Widener University

Jennifer M. Tobias  
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Neet Priya Bajwa  
Illinois State University

Eva Thanheiser  
Portland State University

Tasks are critical for engaging preservice and inservice teachers in better understanding the content they are expected to teach. A good task can serve as an introduction to important mathematical ideas (Liljedahl et al., 2007), promote reflective abstraction (Thompson et al., 2007), or provide a context for conversations about mathematics (Smith & Stein, 2018). In short, tasks serve a variety of important purposes related to engaging preservice and inservice teachers in learning about the content they will teach (Association of Mathematics Teacher Educators (AMTE), 2017). Despite their importance, little scholarship has been written about how tasks are developed, particularly for teachers, and what the goals of tasks in teacher development might be.

In an AMTE 2020 symposium session, we highlighted the work of three teams of researchers all involved in the design of tasks for teacher learning. The three teams invited the audience into discussion about how to design tasks that engage preservice and inservice teachers in learning important mathematics consistent with the AMTE Standards for Preparing Teachers of Mathematics (SPTM; AMTE, 2017). For each project, we focused on two driving questions: (1) What are the team's design principles for developing tasks? (2) How does the team want the tasks to shape the learning environment – particularly the use of representations, the use of technology, and/or the role of discussion in the learning environment? Each team brought a task that exemplifies their design principles for the audience to explore and discuss how it embodies the design principles. Our intention for this was to open serious discussions in the AMTE community about the design of tasks to help teacher meet the goals of the SPTM (AMTE, 2017).

Project 1: Melissa Boston and Amber G. Candela engaged teachers in deeply considering the cognitive demands of mathematical tasks and how those tasks are implemented during instruction, including the richness of the mathematical discussion and students' written work. Their goal is to empower teachers to self-monitor and self-reflect upon their implementation of tasks and mathematical discourse, identifying their own strengths and pathways for improvement. Because time with teachers, in professional development and in methods courses with preservice teachers, is so precious, a mathematical task used for professional learning has to serve multiple purposes. Boston and Candela design or select tasks for inservice and preservice teachers that: a) provide participants the opportunity to engage in mathematics as learners (e.g., puts them in a problem-solving space, provides the opportunity to use multiple representations or strategies); b) involve key mathematical topics (e.g., topics identified as hard to teach and hard to learn), and c) surface important aspects of pedagogy, particularly around implementing cognitively challenging tasks and orchestrating discussion. Often, they select or modify tasks that connect to a vignette (in video or written form) where they can explore content together with a specific aspect of teaching mathematics.

Project 2: Dana Olanoff, Jennifer M. Tobias, Neet Priya Bajwa, Eva Thanheiser, Rachael M. Welder, and Ziv Feldman (a.k.a., Task Masters, 2020) presented their multi-university research focusing on designing tasks for preservice elementary teachers (PSTs). Guided by research on task design (e.g., Liljedahl et al., 2007), mathematical knowledge for teaching (e.g., Ball et al., 2008), and the Common Core State Standards (National Governor's Association and the Council of Chief State School Officers [NGA-CCSSO], 2010), they designed tasks to help PSTs develop conceptual

understandings of the mathematics they will teach. They also strive to create mathematical experiences that authentically connect to PSTs' future work with elementary students.

To do this, they begin by selecting a task from an elementary curriculum that focuses on the mathematical content they want PSTs to learn and identify specific learning goals for this content with PSTs. They then modify the children's task to make it appropriately challenging for PSTs, by limiting their use of the procedures with which they are already familiar. This can be done by directly instructing PSTs not to use particular procedures (e.g., the invert and multiply algorithm for fraction division) or restricting their application of procedures to those they are able to explain conceptually. However, the Task Masters' work focuses on carefully designing tasks in ways that make applying such procedures less efficient. For example, in their fraction comparison task (Thanheiser et al., 2016) PSTs are asked to compare  $\frac{1}{4}$  versus  $\frac{25}{99}$  and  $\frac{2}{17}$  versus  $\frac{2}{19}$ , to deter PSTs from automatically finding common denominators). After PSTs in their courses engage in the task, the research team analyzes PSTs' work to see if they have met the goals of the task. Drawing from their analysis of PSTs' thinking elicited through their initial task, they make modifications to the task to better serve their goals and implement the revised task again. Their eight-step task design cycle has been illustrated in Tobias et al., 2014. More information about their work can be found on their website (Task Masters, 2020).

Project 3: Chandra Orrill and Rachael Brown shared an NSF-funded project focused on engaging middle grades teachers with dynamic environments to better understand proportional relationships. In this project, they aim to have teachers play with the mathematics, which they define as engaging in problem solving in a way that relies on making mathematical arguments and testing conjectures using the dynamic environment to test, illustrate, and explain ideas. They define worthwhile tasks as those that are relevant to classroom teaching, allow for argumentation, feature ambiguity that sparks argument, and have either multiple solution paths (open middle) or multiple solutions (open ended). They are dedicated to engaging teachers in meaningful mathematics conversations; thus, every task needs to be generative, allowing participants opportunities to think out loud about their mathematical understandings.

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### MEMBERSHIP

The AMTE-TX official membership cycle is from July 1 through June 30. Typically, members join or renew memberships at CAMT or at the AMTE-TX Fall Conference. Encourage your colleagues to join!

You can easily join or renew your membership at <https://amte-tx.com/join-or-renew/>

For any membership questions, please contact our Membership Coordinator, Ryann Shelton at [Ryann\\_Shelton@baylor.edu](mailto:Ryann_Shelton@baylor.edu)

### Call for Submissions for *JMTET*

We welcome manuscripts on all topics relevant to mathematics teacher educators in Texas.

**Don't forget our special call for manuscripts! See page 3 of this issue.**

Submit articles by **March 1, 2021**.

Visit the AMTE-TX website for submission guidelines.

**Questions?  
Interested in becoming a reviewer?  
Contact the *Journal* Co-Editors:  
[jmtet.amtetx@gmail.com](mailto:jmtet.amtetx@gmail.com)**