

Poster Session

Tuesday, April 2, 2019 from 4:30 – 6:00 p.m.

Ballroom D, San Diego Convention Center

Poster #	Poster Title
#57	<p>106 - Shaping Preservice Teachers' Conceptions of STEM Through Collaboration (Rupe, Bartels)</p> <p>STEM education has gained much attention in recent years. In order to teach STEM, preservice teachers must have experiences in undergraduate courses. A collaborative unit on STEM was taught while students were dually enrolled in math and science methods courses. Surveys and lesson plans were used to investigate what are preservice elementary teachers' understandings of STEM and planning for STEM lessons after explicit modeling and practice in elementary mathematics and science methods courses?</p>
#58	<p>122 - Polya's Problem Solving Method and Student Attitudes Towards Mathematics (Schuster)</p> <p>This is a quantitative case study with the purpose of examining whether a focus of Polya's four-step problem solving method can improve the attitudes of high school students towards mathematics. The primary method of evaluating student attitudes was via the Attitudes Towards Mathematics Inventory. On average the attitudes of students in each course improved, with statistically significant results in three of five courses. Significant results were also found in two of the four ATMI subcategories.</p>
#59	<p>127 - Promoting Mathematical Practices for Students with Autism Spectrum Disorder (Cox)</p> <p>In a series of studies, researchers investigated the effectiveness of modified schema-based instruction on mathematical practices (CCSS, 2017) for students with autism spectrum disorder. Using single-case multiple probe across behaviors design, participants were taught to use schematic diagrams to solve multiplicative mathematical word problems while engaging in mathematical practices.</p>
#60	<p>132 - The Mindset Disconnect in Mathematics Teaching (Sun)</p> <p>Growth mindset (the belief that math ability can grow) has gained popularity in mathematics classrooms, but research is only beginning to examine how teachers are implementing mindset ideas into their instruction. This session examines how teachers communicate mindset messages and identifies instances when teachers who report having more of a growth mindset may be sending contradictory messages. This session is relevant to researchers and practitioners.</p>
#61	<p>133 - Opportunity to Learn: Geometry and Mathematics Textbooks (Hatziminadakis)</p> <p>This study was conducted to examine the treatment of the surface area and volume concepts within middle-grades mathematics textbooks. In particular, I examined the performance expectations within tasks to determine students' opportunity to learn these geometric concepts. I adapted the TIMSS (2002) Performance Expectations for Mathematics Framework to examine the tasks. Results indicated that there were significant differences in the performance expectations within tasks across textbooks.</p>
#62	<p>153 - Peer Advising in a STEM Summer Camp as Early Field Experience (Quander, Redl, Trujillo, Uppal)</p> <p>This study is on the experience of STEM majors as peer advisors (PA) in a STEM-focused summer camp. Participants in the study worked as PAs during the summer in an enrichment program for grade 7-12 students. Qualitative data indicates that the experience confirmed an interest in teaching but did not necessarily encourage those who were not interested originally to pursue teaching as a career. Participants also reported developing leadership and professional skills and bonding with peers.</p>
#63	<p>168 - Impact of a professional learning math pilot for Early Childhood Educators (Gamino, Russell, Rizo)</p> <p>The purpose of this study is to understand early childhood teachers' perspectives as they engage in a mathematics professional learning program. The professional learning addresses pedagogical content knowledge, knowledge of children's mathematical thinking through professional noticing, and teachers' attitudes and beliefs about mathematics education. Qualitative data analysis suggested teachers experienced shifts in their perspectives as learners and teachers of mathematics.</p>
#64	<p>176 - Pre-Service Teachers' Beliefs and Growth Mindset Assessments (Waid, Velamur)</p> <p>Case studies exploring the relationship between mindset messages conveyed in assessments created by pre-service mathematics teachers and their reported beliefs will be presented. Findings of the study suggest that strong beliefs about the multidimensional nature of mathematics, as well as a growth mindset may have some relation to the creation of a growth mindset assessment. Stronger multidimensional beliefs were also related to the inclusion of multiple representations in assessments.</p>

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#65	<p>177 - The Quality of Elementary Mathematics Activities on Teachers Pay Teachers (Dick, Wismer, Shapiro, Sawyer)</p> <p>Little is known about the quality of resources teachers find online and implement in their classrooms. According to a 2018 survey of 601 elementary teachers across the US, Teachers Pay Teachers (TpT) is the most utilized online source. Because the quality of mathematics activities posted on TpT is unknown, we studied the cognitive demand of the top 500 free activities. We share results of the analysis related to grade band, mathematics topic and types of pictures on the activities.</p>
#66	<p>193 - Greenhouse effect: An Issue of Social Justice through Mathematical Lens (Basu, Panorkou)</p> <p>Here we describe an instructional module on the Greenhouse effect, which seamlessly integrates mathematics, environmental science, and technology. The integration aims students to utilize the power of mathematics to think critically about greenhouse effect and express and challenge views on this topic. The results from a design experiment in a sixth-grade classroom show that students used mathematical thinking to identify and question the different traits of climate change and its consequences.</p>
#67	<p>206 - Follow Up Moves in Whole-Class Discussions About Fractions (Foxworthy)</p> <p>This poster summarizes a study examining one teacher's whole-class mathematical discussions about fractions in a fifth-grade classroom. The teacher's follow-up moves were analyzed for two characteristics of productive discussions, responsiveness and intellectual work. Discussions showed a pattern of eliciting, probing, and interpreting student ideas, and levels of responsiveness and intellectual work occurred in patterns within these phases.</p>
#68	<p>211 - "A Simple Yes or No?": How Word Problem Design Affects Student Sense-Making (Kirkland)</p> <p>A well-established finding in problem solving research is that students often do not make sense of "traditional" word problems, providing nonsensical responses. This study investigated the impact of rephrasing the question of a word problem on student sense-making. Using an individual RCT design, 229 middle school students solved a set of rewritten (or control) word problems in class. Students in the rewritten condition demonstrated more sense-making on the assessment than in the control groups.</p>
#69	<p>232 - The Effect of Math Instructional Coaching on Instruction (Turan, Almager, Sayilir)</p> <p>Several factors have contributed to improving teachers' instructional practices. Instructional coaching (IC) is one such factor which increases teachers' growth by helping them see their strengths and weakness. This mixed methods research study was conducted to measure instructional practices of teachers and their perceptions on instructional coaching performance. The participants of the study were 22 6th through 12th-grade level math teachers and 6 instructional coaches from six urban school districts.</p>
#70	<p>233 - The Detailed Analysis of the Middle Grade Math Teachers Lesson Practice (Turan, Matteson)</p> <p>While viewing the video recorded lessons of middle school mathematics teachers, the researchers noticed teachers have a difficult time regarding lesson instruction. The 5E instructional model is known for increasing student engagement and participation in the learning process. This case study explored the extent to which mathematics teachers used the 5E instructional model in their classrooms through analyzing video recorded lessons.</p>
#71	<p>244 - Filling the Gap: The STEM Enrichment by Design (STEMed) Project (Lopez, Rodriguez)</p> <p>The STEMed Project was created to (1) design an effective STEM pathway model to be used institutionally; (2) decrease amount of time students spend on prerequisite math courses from four semesters down to one year or less; (3) provide equal access to support (mentoring, tutoring, etc.) and scholarships; and (4) promote enthusiasm for mathematics through participation in STEM-related activities/events.</p>
#72	<p>248 - Student Perceived Opportunities to Learn in Testing Oriented Classrooms (Chavez)</p> <p>This study examined the relationship between testing environment, perceived opportunities to learn, and math achievement. Student surveys (N=24,208) were analyzed and showed that students perceived their opportunities to learn to increase as testing environment increased. However, increase in testing environment led to lower achievement scores. Representative videos of both high and low testing classrooms showed that opportunities to learn also decreased as testing environment increased.</p>

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#73	<p>260 - Eliciting Prospective Secondary Teachers' MKT through Modeling Activities (Abassian, Safi)</p> <p>This poster presentation discusses a dissertation study that examined how engagement in modeling activities elicited preservice teachers' mathematical knowledge for teaching algebra. The multiple case study analyzed video and audio recordings, artifacts, and interviews, using the Knowledge of Algebra Teaching framework. The findings demonstrate preservice teachers' MKT can be elicited through planning, analyzing, writing, forming connections and reflecting on mathematical content and processes.</p>
#74	<p>262 - The Use of CODAP as an Instrument for Exploratory Data Analysis (Barker)</p> <p>Exploratory Data Analysis (EDA) using dynamic statistical software is an effective way for statistics teachers to actively engage students in data investigations. This research attempts to answer questions posed in a case study done by Ben-Zvi and Ben-Arush (2014) that explored students use of TinkerPlots as an instrument for EDA. Instrumental genesis (IG) is used as a framework in analyzing students use of Common Online Data Analysis Platform, CODAP, as a tool for a statistics investigation.</p>
#75	<p>263 – Teaching word problems informed by learning trajectory in China and the US (Kimmins, Seat, Frideczky, Winters)</p> <p>Teaching additive comparison word problems is challenging. This study examined two exemplary lessons of teaching comparison word problems in China and U.S. The lessons were informed by a learning trajectory and developed through lesson study. The findings showed that teachers emphasized use of multiple representations and making use of students' misconceptions. Yet, the Chinese lesson stressed the structure of problems, while the U.S. lesson emphasized multiple approaches to solving problems.</p>
#76	<p>273 - Expanding Dispositions by Using Integrated STEM Unit in Elementary Methods (Maiorca, Benken)</p> <p>Pre-service teachers' dispositions towards integrated STEM impact their willingness and ability to teach it. This study examined the impact of STEM modules in an elementary mathematics methods course on preservice teachers' dispositions towards STEM. After completing the activities in the STEM modules all participants felt more prepared and confident to integrate STEM disciplines. This study demonstrates the importance of including integrated STEM in elementary mathematics methods courses.</p>
#77	<p>281 - Categorizing Students' Classroom Experiences with Cluster Analysis (Tarr, Middleton)</p> <p>The authors present data and analysis of self-reported student engagement data and how this analysis was used to categorize students based on their self-reported classroom engagement. This mixed methods study provides a novel way to examine student engagement as the students see it.</p>
#78	<p>301 - Support middle school students in problem-posing: A personalized approach (Wang)</p> <p>This teaching experiment study was designed to investigate the impacts and important scaffolds when implementing personalized problem posing for middle school mathematics. Our analyses indicated that more productive peer interactions and successful transfers of knowledge were identified but the discrepancy between students' understanding of the real-world scenarios and the algebraic representations also existed which made teaching scaffolding implicitly important in this personalized approach.</p>
#79	<p>302 - Mathematical Modeling from the Practitioners' Perspective (Alhammouri)</p> <p>High school mathematics teachers have a responsibility to prepare students to enact mathematical modeling (MM) at the college level. However, what kind of modeling do their students need to experience to be ready for college modeling? In this poster, I present how college professors (i.e., practitioners) conceptualize the mathematical modeling process and what kind of suggestions they offer to school teachers to prepare their students for mathematical modeling at the college level.</p>
#80	<p>322 - Mathematics Task Demands in Small Group Learning Environments (Gordon, Hamm)</p> <p>Group work in secondary classrooms provides potential for students to engage in challenging mathematical work with peers. In small group environments, students' mathematics discourse and peer social dynamics can vary widely among groups within the same classroom. Using data from two classrooms using cognitively demanding tasks, this study examines episodes of group work differing in discourse and dynamics to investigate how these factors relate to engagement with the cognitive demands of tasks.</p>

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#81	<p>324 - Mathematical Reasoning and Modeling: A Way to Change Teacher Knowledge (Choi, Hwang, Jensen, Meiners, Wu)</p> <p>Emphases on mathematical reasoning and modeling have been made through CCSSM and supporting research as an ample practice to be successful in mathematics learning. However, elementary teachers have not develop deep understanding of such practices and are not confident in implementing in classroom. This project offers elementary teachers an opportunity to learning mathematics content using the reasoning and modeling approach as students, which resulted in improvement in teacher's MKT.</p>
#82	<p>334 - Teachers' Uses of Instructional Strategies and Organization of Students (Cudd, Williams)</p> <p>Beginning secondary mathematics teachers' classrooms were observed to investigate the ways in which they organized students for learning, their uses of instructional strategies, how these may differ based on the level of course being taught and whether these choices vary over time. We found teachers consistently utilized whole class instruction for about half the time and provided students opportunities to learn more in small groups than as individuals.</p>
#83	<p>338 - Choose Your Words Wisely: Supporting Students as Mathematicians (Curtis)</p> <p>The language that teachers use send overt and subtle messages about what it means to be a student of mathematics. In this study, I decompose the language a teacher uses to support students to act as mathematicians. The teacher used words and phrases to set the norm, to give students feedback about their thinking, to show value for their thinking, and to explicitly call students mathematics. These moves may provide teachers with insights on how to help their students as like mathematicians.</p>
#84	<p>346 - Productive Struggle: Creating and Resolving Uncertainty with DGE Tasks (Jairam)</p> <p>This study explores the potential of a focus on uncertainty as a teaching lens to engage students in productive struggle. Mathematical tasks were designed in such a way as to create uncertainty. High school geometry students worked on these tasks using GeoGebra as a tool for navigating these uncertainties to help make their struggle productive. Classroom observations were analyzed to determine if the tasks created uncertainty as intended and if the uncertainty lead to student struggle.</p>
#85	<p>355 - Students' perceptions of ambitious mathematics instruction (Gonzales)</p> <p>Preliminary interview results with secondary students suggest that students' perceptions of instruction are such that students are struggling to value the ambitious instruction present in their classrooms. Although students see some value in portions of the instruction, and mathematics classroom such as working together or the value of multiple mathematical representations, there are other facets of ambitious instruction with which students report feeling frustrated and dissatisfied.</p>
#86	<p>356 - Examining Relationships Among Mathematics Knowledge for Teaching Skills (Flores, Wang, Yi, Zeng)</p> <p>Drawing on video surveys completed by elementary preservice teachers, this study examined whether there was a difference in their performance among six mathematics knowledge for teaching components and whether there was a relationship between these components. Results found that preservice teachers performed significantly better on some components than others. In addition, results found weak, but positive, relationships between various component scores.</p>
#87	<p>357 - Elementary Preservice Teachers' Identification of Problem-Solving Tasks (Morrissey, Popovic, Kartal)</p> <p>This study investigated how preservice teachers identified problem solving tasks in a math methods class assignment, which entailed selecting a cognitively challenging task as part of a lesson plan. Analysis revealed that the majority of tasks were typical textbook style problems that required students to practice calculations. Only 12 of the 86 problems met all criteria to be considered problem solving tasks. Authors concluded preservice teachers struggle to move beyond familiar word problems.</p>
#88	<p>362 - Relating Beliefs and Practices in Equitable and Ambitious Math Teaching (Boston, Parke, Badertscher, Thomas-Browne)</p> <p>In this report, we examine the connection between teachers' beliefs and practices regarding ambitious and equitable mathematics instruction for mathematics teachers (n = 38) participating in a two-year professional development initiative. Based on our results, we posit that ambitious instruction is inherently more equitable, and equitable instruction is inherently more ambitious, as teachers with more productive equitable beliefs were shown to enact more ambitious instructional practices.</p>

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#89	<p>363 - Empowering Girls, One STEM Camp at a Time (Vela, Bevan, Caldwell, R. Capraro, M. Capraro)</p> <p>At an early age, women should be encouraged to pursue a career in science, technology, engineering, and mathematics (STEM). The purpose of this study was to determine the impact an all-girls STEM camp had on girls' perceptions of science, mathematics, and engineering and if the experience impacted girls' desire to pursue a career in a STEM field. The researchers found the correlation between girls' perceptions of mathematics and science was highly associated with their interest in a STEM career.</p>
#90	<p>376 - Teachers' Use of Insider Knowledge when Noticing Children's Thinking (Jessup, Pynes)</p> <p>We will report on a multiple-study approach to examining the case of teachers' use of insider knowledge when noticing children's mathematical thinking both as individuals and as a collective. We will highlight examples of when this knowledge enhanced and impeded noticing children's mathematical thinking, and how noticing with a partner teacher provided an opportunity to support insider knowledge with details of the student's strategy.</p>
#91	<p>378 - A Strategy for Addressing Elementary Pre-Service Teachers' Math Anxiety (Karunakaran)</p> <p>Mathematics anxiety among elementary preservice teachers (ePSTs) is a well-documented phenomenon. This poster will describe preliminary results of a policy that increased informal interactions between students and instructor during an elementary mathematics content course, and how such interactions has the potential to decrease ePSTs mathematics anxiety.</p>
#92	<p>380 - Measuring PSTs' Geometry Knowledge for Teaching 2D shapes: A Validity Study (Yi, Flores, Lee, Wang)</p> <p>This study examined reliability and validity of the GKT-2D scale, an instrument developed to measure elementary PSTs' geometry knowledge for teaching 2D shapes. Item analysis and confirmatory factor analysis with 307 PSTs supported the ability of the GKT-2D to represent geometry content knowledge (GCK), knowledge of geometry and students (KGS), and knowledge of geometry and teaching (KGT), showing a great potential to measure both content and pedagogical content knowledge for teaching 2D shapes.</p>
#93	<p>386 - Making Rigorous Mathematics Instruction Accessible to Diverse Learners (Moeller, McLeod, Duncan, Hitchcock)</p> <p>We report the results of a randomized controlled trial of a professional development program designed to help elementary school teachers differentiate rigorous mathematics instruction for students with and without disabilities. We found statistically significant differences favoring the treatment group on: teachers' comfort and preparedness to teach mathematics to diverse learners; teachers' emotional support in the classroom; and students' mathematics achievement.</p>
#94	<p>388 - Elementary Pre-Service Teachers' Math Narratives: A Look Over Twenty Years (Goldsmith-Markey, Remillard)</p> <p>Pre-service teachers' (PST's) experiences learning math from kindergarten to college can have a lasting impact on how they approach math and math teaching. Using a 20-year data set we explored PST's narrative arcs by building on Drake's (2006) and McCulloch et al.'s (2013) typologies. We examined trends in the nature and prevalence of these arcs over time. Given recent math reform initiatives, we anticipated shifts in the types of experiences described by PSTs, but found they were consistent.</p>
#95	<p>391 - Using a STEM club to support beginning teachers in math and science methods (Brown, Fadigan)</p> <p>This poster shares results of two versions of incorporating an after-school STEM club into elementary undergraduate mathematics and science methods courses. The instructors of the two methods courses worked together to provide an informal field experience for pre-service teachers to observe and experiment with various pedagogical ideas while learning to teach about number, astronomy and computational literacy. Successes and limitations from both experiences will be shared.</p>
#96	<p>394 - Parents' Influence on Latina Girls' Mathematics Identities (Guzman)</p> <p>The participants of this study were part of an out-of-school mathematics program whose goal is to foster the development of positive mathematics identities of Latina girls. This qualitative study explores how Latino parents may influence their daughter's mathematics identities. Using Danny Martin's (2000) definition of mathematics identity as the framework for this study allows us to explore social-historical, community, school, and intrapersonal factors.</p>

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#97	<p>398 - Co-constructing Conceptual Neighborhoods: A Working Metaphor (Nichols)</p> <p>The current philosophical work explores how each classroom is an epistemic community with endogenous practices and content. I propose a theoretical construct of classroom participants co-constructing a conceptual neighborhood as a metaphor for the collective work the students and teacher do together. I present two contrasting empirical cases from the literature that demonstrate this conceptual building as a characteristic of collective mathematical spaces breaking the social-mathematical divide.</p>
#98	<p>400 - Researching mathematics for pre-service elementary teachers: A reflection (Nguyen, Otto, Marlow)</p> <p>This qualitative research examined the impact that studying the historical development of a mathematical topic has on pre-service elementary teachers' reflective process. Participants in this study are 120 pre-service elementary teachers enrolled in a teacher preparation program at a four-year institution in the Southeastern United States. Results show that pre-service teachers were critical in how they reflected the research have sharpened their mathematical knowledge of the topic</p>
#99	<p>402 - Unbounded Shearing: A Design-Based Study of an Immersive Environment (Bock, Dimmel)</p> <p>We report on a design-based study of a virtual environment where pre-service elementary teachers (PSETs) explored triangle and pyramid manipulatives in an immersive virtual environment. The objective of the study was to report on how the affordances of the designed environment support the PSETs explorations of measure. Participants used a gesture-based interface to shear triangles and pyramids and made claims about their areas and volumes.</p>
#100	<p>404 - A Learning Assistant Program and Becoming a Mathematics Teacher (Fernandez)</p> <p>A LA program was investigated to recruit strong STEM undergraduates to become mathematics teachers. Participants' motivations and influences for becoming or not a mathematics teacher were examined in relation to their experiences as a LA. The LA Program was found to reaffirm for some participants the choice to become a teacher, clarified for some that it might be a career for them, and did not affect others' thinking about becoming a teacher.</p>
#101	<p>411 - Characteristics of Preschoolers' Evolving Mathematical Knowledge (Shumway, Reeder)</p> <p>Developmental progressions are a tool for understanding children's development of mathematical knowledge. By understanding how three-year-old preschoolers' mathematical knowledge evolves over time, instruction can be tailored to extend a student's current knowledge base. Researchers utilized a multiple-case study method to explore the evolving mathematical knowledge of five three-year-olds' over the course of one year. Data sources included assessments, observations, and interviews.</p>
#102	<p>412 - Japanese Junior High School Teachers' Planning Practices (Melville, Corey)</p> <p>Japanese mathematics teachers are excellent at planning and enacting high quality lessons that engage students. The preparation that is required for these types of lessons is essential; however, this preparation process is a cultural aspect to teaching among Japanese educators. This study looks in depth at these planning and preparation practices among Japanese junior high school teachers. Through understanding this process, US teachers might be able to emulate the same high-quality lessons.</p>
#103	<p>419 - Advancing the Mathematics Equity Agenda Through Digital Game-Based Learning (Pope)</p> <p>This study advances the equity agenda in mathematics education through digital game-based learning (DGBL). It examines the DGBL experience of historically underserved students in their elementary classes. I describe their experience in terms of the mathematical proficiency, cultural models of good game players, and preferences in game aesthetics. Implications are discussed.</p>
#104	<p>423 - Values or Frequency in Secondary Mathematics Classrooms in Hawai'i (Moore)</p> <p>The purpose of this empirical study is to assess and evaluate the psychometric properties of the WIFI questionnaire, as well as to examine response patterns of secondary students from Hawai'i to determine the underlying factor structure. Principal Component Analysis of 363 student responses to the 65-item survey revealed that the instrument measured frequency of engagement as a proxy for values, suggesting that frequency of engagement is a mechanism for valuing.</p>