

TERC Staff Conference Presentations Spring 2016

TERC Staff Conference Presentations—Spring/Summer 2016

- Computer Science Teachers Association (CSTA)
 - National Association for Research in Science Teaching (NARST)
 - National Council of Teachers of Mathematics (NCTM)
 - Council for Exceptional Children
 - National Council of Supervisors of Mathematics (NCSM)
 - Commission on Adult Basic Education (COABE) Annual National Conference
 - American Educational Research Association (AERA)
 - Consortium of School Networking (CoSN) Annual Conference
 - National Science Teachers Association (NSTA) Annual Conference
 - South by Southwest Edu (SxSWedu)
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Computer Science Teachers Association (CSTA)

July 10-12, 2016 | San Diego CA

Do “More More More” with Zoombinis Logic Puzzles

Presenters: Erin Bardar (TERC), Barbara MacEachern (TERC) and Teon Edwards (TERC)

Sunday, July 10, 2016 1-4 PM

Abstract: Join us on an Epic Journey of Fun and Logic! Nearly 20 years after its original release, Zoombinis, the beloved math and logic game, is back! Revamped for tablets and computers, this popular game-based learning experience includes math-based logic puzzles that reinforce computational thinking skills, including data representation, deductive reasoning, pattern recognition, problem decomposition, hypothesis testing, and more. Sort, sequence, and match Zoombinis with varying attributes in increasingly complex patterns as you help these quirky blue characters escape the evil Bloats and make their way to the safety of their new home in Zoombiniville. In this session, you will get hands-on experience playing Zoombinis, learn how the game maps to CSTA K-12 Computer Science Standards, Common Core State Math Standards, and 21st Century Skills, and explore ways to effectively incorporate the game into your classroom curriculum to develop students' computational thinking.

Past Events

National Association for Research in Science Teaching (NARST)

April 14-17 | Baltimore MD

Building systems from Scratch: An exploratory study of student learning about climate change

Presenters: Gillian Puttick (TERC) and Eli Tucker-Raymond (TERC)

10:15am - 11:45am | Gibson

Abstract: Computing has been a foundational tool in the development of scientific understanding of current and future impacts of climate change, the most important socio-scientific issue facing society today. Science practices, such as modeling and abstraction, are critical to understanding complex systems dynamics integral to understanding climate science. Given the demonstrated affordances of game design in supporting computational thinking, many aspects of which are akin to systems thinking, we implemented a free four-day intensive game design and climate change workshop for middle school girls that focused on game design to teach about climate change. In the workshop, five girls used the object-oriented programming environment, Scratch, to create games based on a systems perspective on climate change. We present findings related to the experience of Lori, a girl with no prior experience with Scratch. Findings are organized into three broader categories: a) analogies to science content in the games, b) game design experience, and c) evidence of systems thinking, including socio-ecological connections.

Symposium - Pathways towards Engaging and Equitable Sense-Making for Elementary Teachers and their Students

1:15pm - 2:45pm | Maryland Salon E

Presenters: Christina V. Schwarz, Michigan State University; Angela Calabrese Barton, Michigan State University; Carrie T. Tzou, University of Washington-Bothell; Carolyn Colley, University of Washington-Seattle; Beth Warren, TERC; Ann S. Rosebery, TERC; Elizabeth X. De Los Santos, Michigan State University; Christa Haverly, Michigan State University; Christina V. Schwarz, Michigan State University

Abstract: Sense-making lies at the heart of scientific ways of learning about the world – central to how learners develop and revise powerful science ideas and critical for equity because full participation, epistemic agency, and meaningful contribution to knowledge-building are hallmarks of equitable learning communities. Nonetheless, fostering engaging and equitable sense-making is challenging for teachers. Several research groups and programs have been systematically working on determining how to better help elementary teachers open-up spaces and foster engaging and equitable sense-making opportunities in classrooms. Research groups in this symposium drawn on their work with elementary teachers across the spectrum of experience to share their findings. In particular, the symposium will a) examine aims, goals and definitions of sense-making with an equity focus, b) share research findings in the form of cases highlighting what equitable and engaging sense-making looks like in classrooms at the elementary level, c) illustrate promising instructional practices, tools and approaches that may support engaging and equitable sense-making while considering challenges that teachers and students face, and (e) propose promising future directions for research in working towards engaging and equitable sense-making for all.

National Council of Teachers of Mathematics (NCTM)

April 13-16, 2016 | San Francisco CA

First split into tens and ones: DMI for K-8 teachers

Presenters: Deborah Schifter, Virginia Bastable, and Susan Jo Russell (TERC)

April 15, 2016, 9:45 to 11:00 AM; Moscone South Building, Room 310

Abstract: Updated *Developing Mathematical Ideas* (DMI) professional learning materials are now published by NCTM. Learn about the first module, *Building a System of Tens*, by analyzing video of students' strategies for calculating with multidigit numbers and discussing how students' approaches relate to standards of mathematical practice.

Council for Exceptional Children

April 13-16, 2016 | St Louis MO

Creating access to technology and computer science for students with visual impairments

Presenters: Karen Mutch-Jones (TERC), Debra Bernstein (TERC), Stephanie Ludi

Location, Date, and Time: St. Louis, MO, April 14, 2016, 3:30

Abstract: Many students benefit from technology, but some cannot fully access software and curricular activities because of a disability. This is especially true for students with visual impairments. We will present enhancements developed in the Inclusive Exploring Computer Science project along with results to effectively support student engagement, interest, and learning.

National Council of Supervisors of Mathematics (NCSM)

April 11-13, 2016 | San Francisco CA

Productive Lingering: Elementary Students Learn about Structure of the Operations through Representation-based Argument (Spotlight Speaker)

Presenters: Susan Jo Russell (TERC)

April 13, 2016 at 10:00 AM to 11:00 AM

Abstract: Too often representations are passed over quickly, as if what they illustrate is obvious. What does it look like when grades 2-5 students spend focused time creating, comparing, and analyzing representations in order to understand the structure and behavior of the operations? Video examples from our research will be used to examine these questions

When the numbers are there, but the representation doesn't work: Using elementary students' representation-based arguments to examine their developing understanding of the operations

Presenters: Traci Higgins (TERC), Susan Jo Russell (TERC), Deborah Schifter, Virginia Bastable

Tuesday, April 12, 2016 from 3:30 PM to 4:45 PM San Francisco Convention Center, 3010

Abstract: In this session we will observe elementary students using self-generated representations to reason about computational patterns that are governed by the behavior of the arithmetic operations. Together we will examine and discuss what can be learned about students' developing operation sense by looking at their representations. In particular, we will consider how the salience of number and lack of attention to the arithmetic operations can short circuit student reasoning. Questions that bring the action of the operations into focus can help students align their representational, symbolic, and verbal descriptions and support the development of mathematical argument.

Supporting Students' Mathematical Reasoning with Deeply-Digital Tools

Presenters: Andee Rubin (TERC) with Phil Vahey (SRI) and Nick Jackiw (SRI)

Tuesday, April 12, 2016, 3:30 PM-4:45 PM

Abstract: While every publisher claims that their "digitally-enhanced curricula" will improve students' learning, most such digital enhancements are drill and practice, videos of traditional lectures, or digital incarnations of pre-digital mathematical experiences. In contrast, what we call Deeply-Digital Representational Technologies (DDRTs) can *uniquely* change students' experiences in learning mathematics. DDRTs allow students to engage with mathematical representations that can only be expressed in digital technology, allowing them to develop new mathematical models, and expand their ability to express their mathematical reasoning. This session will describe three approaches to DDRTs that differ in grade level, mathematical domain and design framework. but share the perspective that technology should empower students through an expansion of representational possibilities.

Commission on Adult Basic Education (COABE) Annual National Conference

April 10-13, 2016 | Dallas TX

Fractions: Let's Not Just Memorize Procedures

Presenters: Donna Curry (TERC)

Monday, April 11 from 10:45am -12:00pm

Abstract: In order to align teaching to the College and Career Readiness Standards for Adults, teachers need to pay attention to the structure of fractions. They also need to integrate basic number properties throughout their teaching of fractions. Fraction operations need to be developed conceptually before algorithms are taught. In this workshop, we will explore strategies to develop fraction understanding using visual models and number properties, then linking them to some of the standard algorithms. We will focus participants' attention on: 1. the meaning (models) of the operation. We will explore the different meanings of subtraction, ways to think of division, and the interconnectedness of all four operations. 2. the act of estimating and using mental math strategies. Some of the laws of arithmetic, or number properties, are examined as participants look at different ways to estimate with fractions. Participants will engage in activities that they can immediately take back to the classroom and use with students at all levels.

American Educational Research Association (AERA)

April 8-12, 2016 | Washington DC

Snowballing as a methodological approach for research literature synthesis in education: Synthesizing literature on women of color in engineering.

Fri, April 8, 12:00 to 1:30pm | Convention Center, Level Three, Ballroom A

Presenters: Nuria Jaumot-Pascual, TERC; Maria (Mia) Ong, TERC; Lily Ko, TERC; Apriel K. Hodari, Council for Opportunity in Education

Robots and Romeo and Juliet: Studying Teacher Integration of Robotics into Middle School Curricula

Fri, April 8, 2:15 to 3:45pm | Marriott Marquis, Level Four, Liberty Salon I

Presenters: Debra Bernstein (TERC), Karen Mutch-Jones (TERC), Emily Hamner (Carnegie Mellon University), Jennifer Cross (Carnegie Mellon University)

The Emergence of Young Children's Understanding of the Equal Sign

Fri, April 8, 4:05 to 5:35pm | Convention Center, Level Two, Exhibit Hall D Section A

Presenters: Maria Blanton (TERC); co-authors: Angela Gardiner (TERC), Barbara Brizuela, Katie Sawrey, Kimy Yangsook, Aliska Gibbons

Teaching to Support Mathematical Practice Engagement in the Elementary Grades

Fri, April 8, 4:05 to 5:35pm | Convention Center, Level Two, Exhibit Hall D Section B

Presenters: Eric Hochberg (TERC), co-authored with Traci Higgins (TERC), Jim Hammerman (TERC), and Sheralyn Dash (TERC)

A Longitudinal Study of Elementary Students' Use of Variable Notation to Represent Mathematical Generalizations

Sat, April 9, 10:35am to 12:05pm | Marriott Marquis, Level Two, Marquis Salon 17

Presenters: Maria Blanton (TERC); co-authors Angela Gardiner (TERC), Ana Stephens, Isil Isler, Eric Knuth, Hannah Kang, Susanne Strachota

Organizing Data Journalism Activity in School and Community Learning Environments to Contextualize Science in Life

Mon, April 11, 7:45 to 9:15am | Convention Center, Level One, Room 102 B

Presenters: Joseph L. Polman, University of Colorado - Boulder; Engida Hailye Gebre, Simon Fraser University; Andee Rubin, TERC; Leighanna Hinojosa, University of Colorado - Boulder; Stephen Sommer, University of Colorado - Boulder; Cynthia Graville-Smith, Saint Louis University

Developing Multiple Identities: Undergraduate Scientists Learning to Facilitate Informal Science Education

Mon, April 11, 11:45am to 1:15pm | Convention Center, Level One, Room 101

Presenters: Deana Scipio, TERC; Fan Kong, University of Washington; Kristen Bergsman, University of Washington - Seattle

Creating New Possibilities: Supporting Identities of Youth of Color as Learners and Doers of Scientific Research

Mon, April 11, 11:45am to 1:15pm | Convention Center, Level One, Room 101

Presenter: Tammie Visintainer, TERC

"I Never Thought We'd Go Big!" Becoming Change Agents as Doers of Community-Based Scientific Research

Tue, April 12, 10:35am to 12:05pm | Convention Center, Level Three, Ballroom B

Presenter: Tammie Visintainer, TERC

Targeted Linguistic Modifications of Science Items for English Learners

Tue, April 12, 12:25 to 1:55pm | Marriott Marquis, Level Four, Independence Salon G

Presenters: Tracy E. Noble, TERC; Stephen G. Sireci, University of Massachusetts - Amherst; Craig S. Wells, University of Massachusetts - Amherst; Rachel R. Kachchaf, Smarter Balanced; Ann Rosebery, TERC

Addressing the Linguistic Challenges of Assessing English Learners: A State and Research Organization Partnership

Tue, April 12, 10:35am to 12:05pm | Convention Center, Level One, Room 101

Presenters: Tracy E. Noble, TERC; Catherine Bowler, Massachusetts Department of Education; Rachel R. Kachchaf, Smarter Balanced; Ann Rosebery, TERC

Consortium of School Networking (CoSN) Annual Conference

April 4-7, 2016 | Washington DC

Realizing the Potential of Online and Blended Professional Learning

Presenters: Barbara Treacy and Myriam Steinback (TERC)

April 6, 10:30 - 11:30

Abstract: Online technologies provide powerful opportunities for educator professional learning that can address the limitations of traditional professional development and provide educators important access to content, colleagues and digital learning experiences that can transform their teaching. This session will be an interactive presentation and discussion about the potential of online and blended learning for K-12 educators focused on examples of online and blended professional learning programs that work, and the key features and principles guiding these programs.

National Science Teachers Association (NSTA) Annual Conference

March 30-April 3, 2016 | Nashville TN

NESTA Shares: EarthScope Chronicles—The Newberry Volcano: A Volcano Story

Presenters: Carla McAuliffe (TERC), Erin Bardar (TERC)

Friday, April 1, 2016, 12:30 pm-1:30 pm | Music City Center, Davidson B

Find out about EarthScope scientists' stories and engage in data-based investigations. Bring a laptop and work along with the presenters exploring these resources.

Climate Change Series V: Use NGSS as a Pathway to Climate Literacy—Climate Change Workshop Series @ NSTA

Saturday, April 2, 2016, 2:45-3:45 pm | Music City Center, Room 201A

The NGSS are the first science standards to include human caused climate change as a core idea for students. This session will provide examples of how and where climate concepts can be integrated with the NGSS, review climate relevant performance expectations, and discuss NOAA and partners' efforts to identify NGSS aligned resources.

South by Southwest Edu (SxSWedu)

Deeper Game-Based Learning In and Out of Class

March 10, 2016, 9:30AM - 10:30AM | Hilton Austin Downtown Salon E - TX

Presenters: Jodi Asbell-Clarke (TERC), Greg Toppo, Peggy Sheehy, Paul Davarsi

Abstract: Greg Toppo, author of *The Game Believes in You*, brings together researchers and educators that are taking game-based learning to the next level. Panelists include master educators who are transforming their practice using the games that kids play at home (e.g. World of

Warcraft and Minecraft) as well as designers who are creating games with rich narrative and baked-in research methods to take game-based learning to the next level. The panelists will discuss what it takes to understand the learning that actually takes place in games and how to leverage in and out-of-school gameplay for rich and deeper classroom learning.