

UtahStateUniversity

USU Launches Online Common Core Math Courses



In the Fall 2013 semester, Utah State University launched online Common Core mathematics professional development courses for K-6 teachers. These professional development modules were created to address a need among elementary teachers and leaders for professional development on teaching the Common Core State Standards for Mathematics (CCSSM). The courses were launched in an online platform called the elementary Mathematics Teachers Academy that allows

educators to customize their learning experience. The Academy is comprised of over 100 modules focused

on the CCSSM. The modules are grade-level and mathematics-standard specific. Additional modules focus on leadership, intervention, and assessment. What makes the Academy modules so unique is that teachers create their own customized course using an online course creation tool. After browsing modules by grade level, content strand, mathematical practices, and leadership content, teachers select 3, 6, or 9 modules representing 1, 2, or 3 master's level credits. Each module represents one class session of academic work in a traditional classroom. The selection of the modules and the decision to earn 1, 2, or 3 credits allows choice and flexibility in educators' professional development experiences. The Academy is designed on the philosophy that teachers are knowledgeable professionals who know which areas of their mathematics teaching need improvement. Because the Academy modules are all online, teachers can complete the modules whenever and wherever they choose during the semester. It's the perfect course because you create it yourself! To register today, please contact the Academy Director, Jennifer Boyer-Thurgood (jennifer.boyer-thurgood@usu.edu).

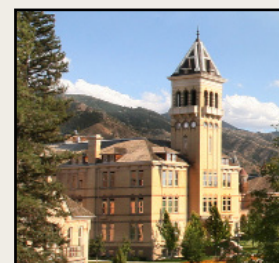
iPad Math Apps Improve Young Children's Learning

Over the past year, the Virtual Manipulatives Research Group (VMRG), a 17-member multi-disciplinary research team led by Patricia Moyer-Packenham (Mathematics Education) and Kerry Jordan (Psychology), has been conducting a study on young children's mathematics learning when using mathematics applications (or "apps") on iPad technology. Currently, little is known about how mathematics learning changes or is influenced when children use a touch-screen interface for mathematics learning. The VMRG is identifying patterns of learning and strategy use that inform the design of instructional sequences in ways that increase children's mathematics achievement. The long-term goal of the project is to build theory and knowledge about the nature of young children's ways of thinking and interacting with virtual manipulatives using touch-screen mathematics apps. During the project, the VMRG has interviewed over 90 children ages 3 to 8. Interviews were conducted in the Early Childhood Education Research Center where there are clinical interview rooms specifically designed for research with young children. The rooms are equipped with two-way mirrors, audio observer booths, and built-in video cameras. Interactions during the interviews were recorded using wall-mounted cameras and wearable Go-Pro cameras to capture

children's interactions with the iPad. Initial findings indicate that children's learning improved in terms of speed and accuracy between pre- and post-tests. The VMRG identified app affordances that supported or hindered children's learning, which is informative to designers of mathematics learning apps for young children. The analyses have resulted in the development of learning progressions for subitizing, counting, skip counting, place value, and seriation. A variety of publications are planned that focus on analyses of speed, accuracy, children's strategy use, and app affordances.



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New USU Graduates Contribute Research Results to Mathematics Education



Dr. Greg Murray, Dr. Patricia Moyer-Packenham,
Dr. Arla Westenskow

At the Spring 2013 Utah State University Commencement Ceremony, two students in mathematics education -- Arla Westenskow and Greg Murray -- completed their PhD degrees. These outstanding graduates are already making important contributions to mathematics education in their respective areas.

Dr. Arla Westenskow is the Director of the Tutoring Intervention and Mathematics Enrichment (TIME) Clinic at Utah State

University. Dr. Westenskow's dissertation research identified variations in the learning trajectories of Tier II students with mathematical learning difficulties. Forty-three students from four schools participated in ten instructional intervention sessions focused on equivalent fraction concepts. The quantitative analysis revealed significant gains for all three interventions. A unique and important aspect of this study was the development of iceberg learning trajectories used to identify five clusters of equivalent fraction understanding and three sub concepts of general fraction understanding important to equivalent fraction mastery. Results demonstrated that the affordances of physical and virtual manipulatives are specific to different aspects of understanding equivalent fractions. This finding suggests that understanding manipulative affordances is critical for determining when and how to use manipulatives during intervention instruction. Dr. Greg Murray is an Assistant Professor of Secondary Math Education at Dixie State University. Dr. Murray's dissertation examined

the relationship between student achievement in Algebra I and the schedule type used to deliver Algebra I courses. The schedule types compared were the traditional daily schedule, trimester 3/3 schedule, trimester 2/3 schedule, and the block A/B schedule. Data were obtained from 50,000 Utah students in over 300 schools. A multinomial logistic regression analysis identified relationships between CRT scores and schedule types indicating significant differences in student achievement based on schedule type overall and on individual grade levels. The earlier the grade level, the higher the CRT score. In grades 7, 8 and 9, the trimester 3/3 schedule was related to higher CRT scores. For grades 10 and 11 the traditional schedule was related to higher CRT scores. The schedule types where students' CRT scores were generally the highest were the trimester 3/3 and traditional schedule, both which have students spending more time in the mathematics classroom and students' mathematics classes met daily. The results suggest the value of daily time spent in the mathematics classroom.

First Cohort of Teachers Completes Elementary Mathematics Endorsement

During the summer of 2013, 30 elementary teachers were the first to complete Utah State University's new Elementary Mathematics Endorsement Program. The program was launched in 2011 with the support of a U.S. Dept. of Agriculture grant for broadcast technology and a Utah State Office of Education grant to support the endorsement for two cohorts of teachers in the Logan City and Cache County School Districts. The teachers who completed the endorsement in this first cohort came from Logan City, Cache County, Tooele, and North Sanpete School Districts. Here's what teachers had to say about the program. Nancy Stewart (Grade 5): *Participation in the endorsement helped me increase my math knowledge and better see where my students needed to go mathematically. That will definitely help me be a better teacher. I loved learning and collaborating with other teachers.*

Karen Muir (Grade 5): *This class has*

changed the way I go about teaching and thinking about mathematics.

Amy Johnson (Grade 1): *I have learned how to teach my students to think critically. This endorsement has changed my teaching.*

The Elementary Mathematics Endorsement is designed to strengthen classroom teachers' knowledge of mathematics content and assessment. The 18-credit (six 3-credit courses) endorsement program includes courses that focus on Number & Operations, Rational Numbers & Proportional Reasoning, Algebraic Reasoning, Geometry & Measurement, Data Analysis & Problem Solving, and



Elementary Math Endorsement Logan Cohort

Assessment & Intervention. Courses in the program are offered in the evenings and summers on a regular schedule so that teachers can complete the endorsement in two years. Courses are available through the Regional Campuses and Distance Education (RCDE) broadcast system so that teachers throughout the state can participate in USU coursework at regional sites.

Current Cohort of PhD Students in Mathematics Education has Wealth of Expertise

In Summer 2013, Utah State University welcomed a new doctoral cohort in Mathematics Education Leadership to campus. This cohort of PhD students brings with them a wealth of expertise in mathematics, education, and leadership.

Pictured in the front row from left to right: Janiece Edgington is a classroom teacher and support services specialist in the Logan City Schools where she manages state and federal grants to support K-12 instruction. Hilal Gulkilik is a visiting scholar from Ankura, Turkey, who spent one year studying at Utah State University from 2012-13. Emma Bullock is the Executive Director of Mountainville Academy, a Utah charter school, and has taught secondary mathematics for 12 years. Pictured in the back row from left to right:

Scott Smith is pursuing his PhD in instructional technology with mathematics as his secondary emphasis, and he has taught in the Department of Mathematics at Utah State University. Don Busenbark is a high school mathematics teacher and university adjunct instructor in mathematics for Utah State University. Ian Sorenson is an Assistant Professor of

Developmental Mathematics at Utah Valley University, after serving for 20 years in the United States Navy as a naval aviator flight instructor. Andrew Glaze is a junior high school mathematics teacher in the Davis School District with experience on the Utah Council of Teachers of Mathematics Executive Board. Stephen Tucker moved from North Carolina, where he was an elementary teacher in the Charlotte Mecklenburg School District, to Utah to pursue his doctorate at USU.

The Mathematics Education and Leadership emphasis in the doctoral program is an advanced program designed to prepare individuals for many positions of leadership in mathematics education. The program is currently recruiting students for the 2014 cohort. Contact the Director, Dr. Patricia Moyer-Packenham (patricia.moyer-packenham@usu.edu) for more information.



Front Row: Janiece Edgington, Hilal Gulkilik, Emma Bullock. Back Row: Scott Smith, Don Busenbark, Ian Sorenson, Andrew Glaze, Stephen Tucker.

Award Winning Graduate Student Researchers

During the Spring 2013 Awards Ceremony for the School of Teacher Education and Leadership, two PhD students in mathematics education -- Katie Anderson and Jessica Shumway -- were honored for their outstanding research and scholarship. Both students were nominated for these awards by their faculty mentor, Dr. Patricia Moyer-Packenham.

Katie Anderson was named the Graduate Research Assistant of the Year. To earn this award, Katie published two refereed journal articles, on one of which she is a sole author. Her research activities include key roles in the Virtual Manipulatives Research Group on two major projects: one where she developed instructional intervention materials and taught intervention lessons in 3rd and 4th grade classrooms, and the

other where she conducted interviews with children ages 3-8 using iPad apps in a clinical interview setting. Katie has presented at multiple national conferences in mathematics education including NCTM, AERA, AMTE, and SSMA. Her expertise in curriculum development and mathematical discourse has made major contributions to the research work in mathematics education at USU.

Jessica Shumway was selected for the Lawson Scholarship Award. This fellowship was established by Fredrick Q. Lawson, the nephew of Emma Eccles Jones, and is awarded to an outstanding student. To earn this award, Jessica produced three publications and six national presentations since arriving at Utah State. In 2011, Jessica wrote a book titled *Number Sense Routines: Building*

Numerical Literacy Every Day in Grades K-3, published by Stenhouse Publishers. This fall, Stenhouse is shooting video footage of Jessica demonstrating the number sense routines in classrooms. Jessica is currently coordinating a major research project on young children's use of iPad technology for mathematics learning.



Katie Anderson and Jessica Shumway



2605 Old Main Hill
Logan, UT 84322-2605



About Us

The Mathematics Education and Leadership Programs in the School of Teacher Education and Leadership in the Emma Eccles Jones College of Education and Human Services provide students with a variety of advanced study options in mathematics education at the graduate level. Students can select the Mathematics Education and Leadership Emphasis in the PhD or EdD doctoral programs, the Elementary Mathematics Endorsement emphasis in the Master of Education Degree in Elementary Education, or the Secondary Mathematics Emphasis in the Master of Education Degree in Secondary Education. The Mathematics Education and Leadership Programs at Utah State University provide students with opportunities to focus on enhancing their mathematics education expertise and develop leadership skills for positions at all levels of mathematics teaching, learning, supervision, and research. Contact the director today to begin your graduate work in Mathematics Education and Leadership at Utah State University!



Patricia Moyer-Packenham, PhD
Mathematics Education and Leadership Program Director

patricia.moyer-packenham@usu.edu
(435) 797-2597