

UtahStateUniversity

Edith Bowen Lab School Mathematics Teacher Collaboration



(pictured L to R) Katie Anderson, Jessica Shumway, Andrea Bostwick and Stephen Tucker at the AMTE Conference

For the past year, Andrea Bostwick and Marianne Christian, second-grade teachers at Edith Bowen Lab School, and Jessica Shumway, Katie Anderson, Stephen Tucker, and Jennifer Boyer-Thurgood, Doctoral-level instructors in the School of Teacher Education and Leadership in the College of Education and Human Services have been collaborating to engage preservice teachers in field experiences at Edith Bowen Lab School that are directly linked to their Elementary Mathematics Methods coursework. This type of

context-embedded approach to a Mathematics Methods course provides preservice teachers with opportunities to deepen their understandings of math teaching methods by explicitly linking theories to instructional practices.

The collaboration began as a partnership between Bostwick's second-grade classroom and Shumway's Elementary Math Methods class of preservice teachers. Bostwick and Shumway believed that lesson study could benefit the teaching and learning experience. For example, preservice teachers benefit from interacting with teachers and children in a real classroom. Classroom teachers benefit from having multiple "data gatherers" during a lesson and from learning research-based instructional techniques. University instructors benefit from staying connected to real classrooms. Most importantly, children benefit from receiving research-based individualized instruction.

In January 2013, Shumway, Bostwick, Anderson, and Tucker presented the results of this collaboration at the Association of Mathematics Teacher Educators (AMTE) conference in Orlando, Florida. Their presentation, titled "Building Partnerships: A Collaborative Lesson-Study Experience in a Preservice Mathematics Methods Course," reported on the collaboration between the Elementary Mathematics Methods course and the Edith Bowen Laboratory School.

Where are they now? Spotlight on Logan Toone

After earning his PhD from the School of Teacher Education and Leadership at Utah State University in 2011, Dr. Logan Toone went on to serve as the Director of Assessment, Research, & Evaluation for the Davis School District. In this position he works with school and district leaders to ensure that classroom and standardized assessments are high-quality and provide the best possible information to educators that will inform instructional decision-making. He oversees research efforts in the district, and conducts both formal and informal program and school evaluations.

Dr. Toone served as the President of the Utah Council of Teachers of Mathematics from 2010 to 2012. Toone is also a favorite adjunct instructor for the Elementary Mathematics Endorsement program. He has taught the Numbers and Operations, Algebraic Reasoning, and Assessment and Intervention courses. His doctoral work at USU instilled in him a love

and an understanding of mathematics education (content and pedagogy) as well as educational research methodologies. He believes that the field of mathematics education is full of exciting questions, challenges, and opportunities that require well-prepared, professional mathematics educators. He loves being a part of the community of mathematics educators in Utah.



Logan Toone, PhD Graduate

Spring 2013 Issue No. 2



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Mathematics Doctoral Student from Turkey is a Visiting Scholar



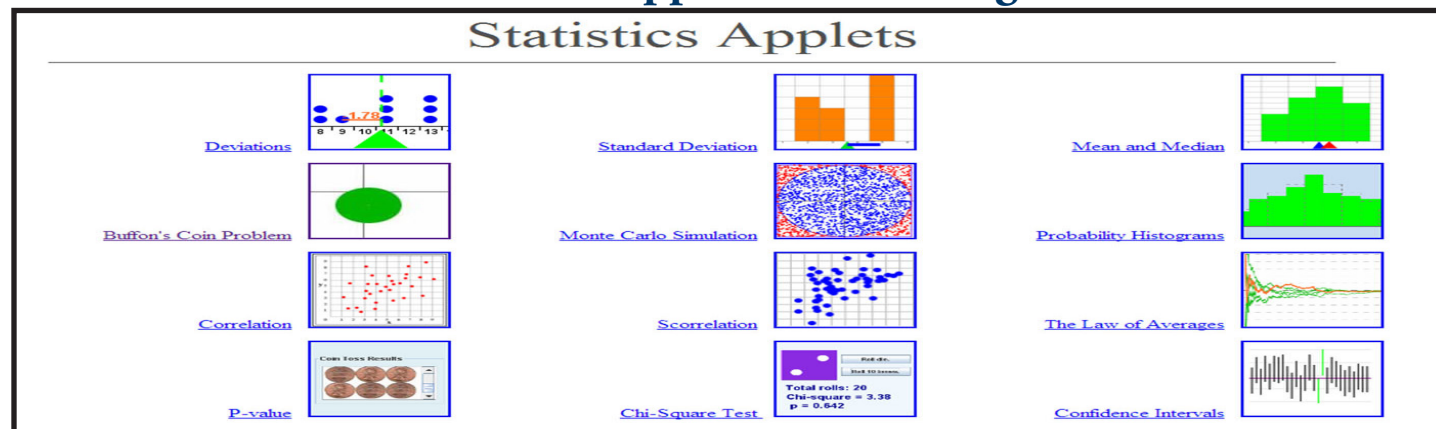
Hilal Gulkilik, Doctoral Student, Mathematics Education, Gazi University, Turkey

Very few doctoral students in Turkey are selected by the country's Mathematics and Scientific Council to receive a one-year fellowship to study at an American University. Hilal Gulkilik, a Doctoral Student in Mathematics Education at Gazi University, was selected for this prestigious honor. To receive the one-year fellowship

(August 2012-13) from The Scientific and Technological Research Council of Turkey (TUBITAK) Gulkilik had to pass both English and Mathematics Education proficiency exams and participate in a rigorous interview processes. Gulkilik chose to study at Utah State University with Dr. Patricia Moyer-Packenham because Gulkilik's research focuses on virtual and physical manipulatives and Moyer-Packenham is known internationally for her research on manipulatives. Gulkilik's dissertation examines the role of manipulatives as mathematical representations in students' growth of mathematical understanding using the Pirie and Kieren model. Since she arrived at USU, Gulkilik has been completing her data analysis, writing her dissertation chapters, attending

mathematics education and technology courses, and participating in Mathematics and Statistics Education meetings and the Virtual Manipulatives Research Group (VMRG) under Moyer-Packenham's guidance. Gulkilik has contributed to the VMRG as an observer on the research team's "Captivated" iPad Research Project, conducted in the clinical research facilities of the EEJ Early Childhood Education Research Center. Through her experiences at USU, Gulkilik has learned a lot from Moyer-Packenham about how to create a data analysis protocol, how to organize all of the chapters of her dissertation and research results, and how to present the results in a dissertation or a research article. She has felt especially welcomed by the five doctoral students who are currently working with Moyer-Packenham on the Logan Campus. Gulkilik has found that, in this research team atmosphere, both faculty and doctoral students learn from each other and each member of the team has expertise and knowledge to contribute.

Mathematics Educator Creates Applets for Learning Statistics



Dr. Kady Schneider's Statistics Applets

Dr. Kady Schneider, an Associate Professor of Mathematics Education in the Department of Mathematics and Statistics at Utah State University, is well known for the technology applets that she creates for students to learn statistical concepts. Schneider has been at Utah State University for 7 years and has created more than 20 applets addressing a variety of areas in probability and statistics. The topics of some of her applets include summary

statistics, geometric probability, the Law of Averages, confidence intervals, and hypothesis testing. The applets are designed to involve students in exploration and investigation of statistical concepts through games and simulations. Applets such as 'the Law of Averages', and 'Confidence Intervals' facilitate discovery by enabling users to change experimental parameters and repeat simulations under a variety of conditions. Whereas, other applets, such

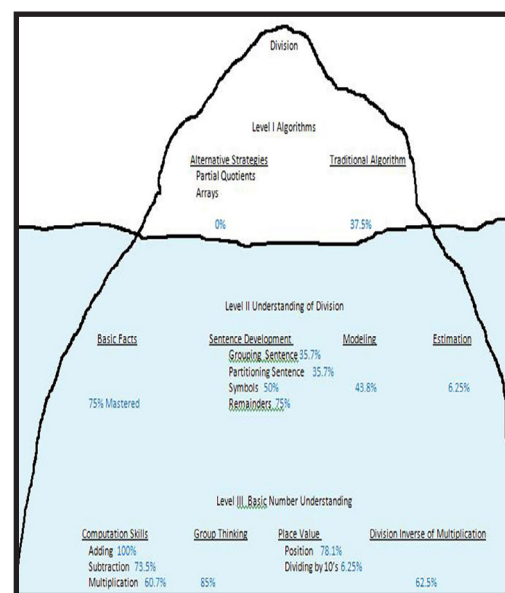
as 'Mean and Median' and 'Scatterplot' contain multiple interfaces that allow users to investigate a statistical topic and then test their knowledge. The applets are designed to appeal to students at a variety of grade levels and have been used in middle school through graduate level classes. The applets can be accessed at <http://www.math.usu.edu/~schneit/CTIS/>

TIME Clinic Develops Iceberg Models for Mathematics Intervention

Researcher and Director Dr. Arla Westenskow at the Tutoring Intervention & Mathematics Enrichment TIME Clinic is developing and piloting diagnostic iceberg models to be used as intervention tools for instruction of students who struggle with mathematics. Iceberg models are organizers of students' knowledge designed to identify areas of students' mathematical understanding which require remediation. The iceberg model uses a metaphor image in which the tip of the iceberg (above the water level) represents the mastery of a skill or concept. The body of the iceberg (below the water level) represents the knowledge, understandings, and skills a student needs for mastery of the concept or skill. The more basic the skill, the lower it is placed on the iceberg. Children often struggle with mathematics because they have not mastered skills and sub-concepts beneath the tip of the iceberg. Iceberg models, developed through a review of the literature by Westenskow make it possible to identify students' underlying mathematical difficulties. For

each component of the model, assessments are developed. Student responses to the assessments are scored and results are entered into the model, providing a visual picture of students' mathematical understanding. The models developed can be used at an individual, class or district level. At the individual level, an iceberg model can be used to identify learning needs of one student, making it possible for instructors to remediate a child's learning gaps. At the class level, student scores for the entire class can be summarized on one iceberg making it possible for teachers to identify concepts which need further development and to identify students who need intervention instruction. Assessments can also be administered at the end of a mathematics instructional unit to determine the effectiveness of the instructional sequence. Similarly, data can be collected from multiple classrooms to evaluate the effectiveness of a mathematics program implementation at the district level. As an intervention tool, the iceberg model has

great potential to be used by teachers and tutors to impact learning for all children in mathematics. Through research collected in the Early Childhood Education Research Center TIME Clinic sessions, researchers are refining models and assessments, developing remediation activities, and designing additional iceberg models.



TIME Clinic Iceberg Model

Dr. Jim Dorward, Mathematics Educator and Research Dean



Eric Packenham and Jim Dorward

Dr. Jim Dorward is a Professor of Mathematics Education, Associate Dean for Research in the College of Education and Human Services, and one of the original creators of the National Library of Virtual Manipulatives (nlvm.usu.edu). In collaboration with Lawrence Cannon, Joel Duffin, and E. Robert Heal, this project has fostered two USU

websites recording over 8 million unique users and 1.5 billion hits a year, multiple commercial licenses to publishers and web-service providers, several hundred research articles and dissertation studies, and over a dozen educational videos. For their work on this project, the team was awarded the Utah Governor's Medal for Science and Technology in 2009.

Dorward joined the faculty of Utah State University 22 years ago, shortly after completing his doctorate at the University of Oregon. During this time, he has published over 25 articles in mathematics education, engineering education, program evaluation, and virology journals. He has also written or co-written over 50 grant proposals, 28 of which have been funded for slightly over 20 million dollars. In addition to the NLVM, outcomes of externally funded efforts include the International Flu

Vaccine Manufacturing Training Program (providing capacity building services in developing countries), the Consortium for Building Evaluation Capacity (a leading provider of evaluation technical assistance), the Instructional Architect (service software for the National Science Digital Library), and the Substitute Teaching Institute (the country's leading advocacy organization for substitute teachers). In his role as Associate Dean, he reports that the most rewarding aspect of his work at USU is providing proposal development and grants management services to faculty and research scientists across the university. Dorward is currently Co-PI with Eric Packenham (PI) on a Department of Education funded Gear Up grant. The Gear Up grant will support a cohort of 2,900 middle school students in Utah and Nevada in their preparation for postsecondary education.



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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!



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