Do you remember walking into class filled with dread about the math quiz that was about to come your way? Patrick McGuire, a UCCS assistant professor of Curriculum and Instruction in the College of Education, is working to alleviate math anxiety by getting students’ spirits and grades up with his unique approach to mathematics.

“I have always been an analytical thinker and a very methodical person,” said McGuire, who earned the National Science Foundation’s Early Career Symposium Award last year.

At the tender and inquisitive age of three, McGuire loved to calculate the change that his family would receive from different purchases. His schoolteacher parents nurtured his fascination with numbers, helping him develop number sense.

His article concluded that integrating the five-frames into the curriculum can “support pre-kindergarten children’s development of Gelman and Gallistel’s three basic counting principles: the stable-order principle, one-to-one correspondence and cardinality.”

McGuire’s early inclination towards mathematics has played a part in him realizing the importance of exposing children to the fundamentals of mathematics in the earliest grade levels. While he is a strong proponent of technology-based programs for middle school and high schoolers, McGuire believes that early childhood educational experiences should be more concrete so that young children can physically touch and manipulate objects.

“Generally speaking, people are starting to realize the importance of math education from pre-K not just high school,” said McGuire, a former research consultant for the Human Computer Interaction Institute at Carnegie Mellon University. “Unfortunately, many times math education is not a focus in the early grades, which can be problematic for a student’s development.”

In his 2011 article, “Developing Number Sense in Pre-K With Five-Frames,” McGuire explores how the tool of five-frames, a game consisting of rows, boxes and movable circles aids in helping young pupils develop number sense.

McGuire was able to lead change within the Pueblo County School System with the help of a $206,320 grant from the Colorado Department of Higher Education for the project titled “Uncovering and Addressing Student Misconceptions: Improving Elementary Teachers Formative Assessment Capacity and Mathematics Pedagogical Content Knowledge.”

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This article stemmed from the dissertation McGuire wrote as a research graduate student at The Curry School at the University of Virginia. While there, he was an integral part of the MyTeachingPartner Math Science Project Through this online program, which won the Association for Educational Communications & Technology’s Outstanding Practice Award, McGuire was able to provide educators with the tools necessary to help guide at-risk students toward success.

With Five-Frames,” McGuire explores how the tool of five-frames, a game consisting of rows, boxes and movable circles aids in helping young pupils develop number sense.

His work crafting curriculum that is sure to improve the performance of struggling students has expanded into a fulfilling career rich with significant results. Taking a hands-on approach, McGuire was able to lead change within the Pueblo County School System with the help of a $206,320 grant from the Colorado Department of Higher Education for the project titled “Uncovering and Addressing Student Misconceptions: Improving Elementary Teachers Formative Assessment Capacity and Mathematics Pedagogical Content Knowledge.”

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This was a great opportunity for me to share some of my knowledge about early childhood math education with nearly 120 first and second grade teachers, math content specialists, and administrators at PCS-60,” said McGuire. “Pueblo is a turnaround district that once had some of the lowest standardized math test scores in the state, both at the elementary and secondary levels.”

The program was so successful that Pueblo County Schools has hired McGuire as its Early Childhood Education Consultant. By providing helpful workshops and activity ideas to teachers, McGuire proves he is fully committed to helping improve education within his state.

It is his hope, however, that significant changes will start to take place nationally. “In terms of changes that I think should be made both locally at UCCS and on the national level, I would love to see more teacher education programs in STEM (Science, Technology, Engineering and Math) specifically designed for teachers who plan to work at the preschool or elementary level,” said McGuire.

McGuire encourages those who have a desire to make a difference and are passionate about teaching to build their careers in education. He recently joined forces with the UCCS Teach Program, which places the next generation of math and science teachers directly into classrooms.

“When I get feedback and comments from students about how they can apply their learning in a practical way that is very rewarding for me,” said McGuire, who got his Ph.D. in instructional technology with a focus in mathematics education. “With my research, I make an effort to investigate research questions and pursue opportunities that will fill gaps in our education system and help teachers to improve their instruction and students to learn more.”

McGuire relishes the opportunity to collaborate with others within his field and in other areas of study. “I think it is really important to get cross-fertilization of ideas. In my main fields of education and technology both are by nature very collaborative things. In my short time at UCCS since 2010, I have had the luxury of collaborating on grants and research projects with many different faculty across the College of Education as well as other colleges across campus.”

In the fall, McGuire will be teaching an innovative course at UCCS where he will work closely with instructors across the college to deliver technology-based lectures in the classroom. “In this way I will be collaborating with students and faculty in areas such as counseling, special education, leadership, curriculum and instruction.”

McGuire believes the future of education should be centered on a creative focus that allows students to explore educational avenues that stretch far beyond filling out Scantron sheets.

“The whole idea for the standardized assessment, while important, has minimized some teachers’ ability to think creatively and innovate,” said McGuire. “Subsequently, students, particularly in older grade levels, do not have the opportunity to express their creativity in the classroom. This is problematic because most, if not all, of the jobs of today and the future are going to require people to think creatively and innovate.”

When not uncovering ways to enhance the classroom experience, McGuire loves to run long distances. He credits the sport with helping him maintain a healthy life balance.

“The beautiful state of Colorado and the amazing running trails were a big reason that I moved out here two years ago,” said McGuire, who trains and races semi-competitively, averaging sixty miles per week. “This place seemed to fit my lifestyle perfectly.”