

Student-professor duo share love for math, puzzles

by Mandy Potts - Tuesday, April 23, 2013

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In theory, math should be fun, right?

"Yes" is most definitely the answer if you ask Ken Price, associate math professor at the University of Wisconsin Oshkosh, and his student John Dewitt, a senior secondary education math major.

Together -- and with the help of the Student Titan Employment Program (STEP) -- the duo came together to both share their love of mathematics as well as to research a type of puzzle that Price had previously created called an arrowgram.

An arrowgram is a type of mathematical puzzle consisting of letters connected by arrows. The arrows point from one letter to another. Some arrows are labeled with numbers, and a rule based on transitivity (a relationship between three elements such that if the relationship holds between the first and second elements and between the second and third elements, it necessarily holds between the first and third elements) is used to label the rest of the arrows.

"My motivation to invent arrowgrams was to find a way to communicate some aspects of my scholarship to people besides mathematicians," Price said. "I was looking to have people do math that was fun."

Arrowgrams also contain secret messages, which is where the fun comes in. The words are formed by pairs of letters. The puzzle is solved when every arrow is labeled with a number and the secret message is revealed. In general, addition and/or subtraction are used to generate a solution.

For Price, his interest in puzzles started when he was young. He remembers liking crossword puzzles as a child. These days, he uses the puzzles in his classroom as a teaching tool.

"I like to try to invent things that get students excited," Price said.

Dewitt was one such student who became excited about the opportunity to learn and solve problems via work with arrowgrams.

"It's the challenge and using critical thinking to solve a problem," Dewitt said. "That's why mathematicians love puzzles - to problem solve, that's what math is."

Under Price's direction, Dewitt created four arrowgram puzzles of his own, which were included in the puzzle packet for the special session on the Mathematics of Sudoku and Other Pencil Puzzles at the 2012 joint meetings for the American Mathematical Society and the Mathematical Association of America, which was held in Boston. Dewitt also gave a poster presentation at a 2013 joint mathematics meeting in San Diego and presented at the recent [National Council on Undergraduate Research Conference](#).

"I was delighted that he wanted to take on the challenge of an undergraduate research project under my supervision," Price said. "This experience will distinguish him from other candidates in his field."

For Dewitt, the opportunity to do research while studying at UW Oshkosh gave him a broader perspective, he said.

"There is more out there than adding numbers," said Dewitt, who upon graduation hopes to be a math teacher. "There is so much to learn and puzzles help us uncover truths. I feel really lucky that Dr. Price helped me come along for the ride."

Price and Dewitt say it takes a few hours to put together a arrowgram puzzle and like in most research processes they consider a question, come up with a hypothesis and draw conclusions. Both hope arrowgrams will seep their way into classrooms of all levels to help others learn and have fun with math.

The Student Titan Employment Program (STEP) offers students quality educational experiences while providing faculty and staff members with needed assistance in areas such as media services, student-faculty research, supplemental instruction, library assistance, instructional technology and academic computing support and Web page development and maintenance.

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