Alessandra Pantano’s theory of joy

The UC Irvine professor of teaching discovered a joy for math as a young girl growing up in Italy. Now, that joy is changing lives in Orange County.

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Professor Pantano thinks the key to effective math education is in growing meaningful mentor-mentee relationships with students.

Picture Credit:
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Alessandra Pantano can still remember when her mom Annabella helped her discover math when she was a child growing up in Italy.

It happened during a game Pantano and her mom, who was a high school math teacher, would play on car rides around the Italian capital, Rome. It was a variation of the 1970s boardgame Mastermind, one where one player came up with a code while the other player had to guess the code.

“It’s a logic game,” said Pantano, professor of teaching in the UC Irvine Department of Mathematics. “We would play with numbers. Everybody had a piece of paper, and we worked it out from there.”

Pantano found the game fascinating, and she counts her memories of cracking codes in the car as some of the best of her life. And though she wasn’t fully aware of it, Pantano was also learning and growing to love mathematics.

“I’m 100% sure my mom was the one who instilled a love for math in me,” Pantano said.

Pantano later realized those car ride games were a profoundly effective way of learning and teaching math, one based not on rote memorization of abstract formulae, but on something far more human: joy.

It was the start of Pantano’s theory of teaching and learning math through joy that would one day have far-reaching impacts for UC Irvine, its students and the middle and high school students of Orange County.

But first Pantano had to find her way to UCI.

As an undergraduate in Italy, Pantano wanted to major in math, but her parents told her not to, mostly because they didn't think it would lead to a good job. Instead, they told her she should major in something like engineering, and she obliged.

“But what happened was, after every single engineering exam I took, my professors would ask me, ‘What are you doing here? It’s so clear that you love math most of all,'” Pantano said.

Pantano switched her major to math and followed that path all the way to graduate school at Princeton University, where she received her Ph.D. studying a part of linear

algebra called representation theory alongside MIT professor David Vogan.

It was at Princeton that Pantano saw her theory of joy come alive while teaching her own linear algebra class. Pantano had been away on a trip to a conference, and when she returned to school there was a surprise waiting for her.

“I came back, and my students had left these handwritten cards with drawings on top of my desk,” she said. “They said things like ‘welcome back, we missed you!’ It was so sweet.”

Pantano saw the power that fostering a rapport with students can have. For her pupils, coming to class and learning math had become a joyful experience.

“You’re an educator, not just a math teacher,” Pantano said.

In 2014, at UCI, Pantano co-founded an outreach program in her department called Math CEO (Community Education Outreach) alongside fellow math professor Li-Sheng Tseng. Math CEO brings middle and high schoolers from schools in Santa Ana to campus so they can connect with undergraduate mentors and explore math together.

An independent study commissioned by the Santa Ana School District in 2025 found a correlation between students who participated in Math CEO and improved performance on everything from standardized tests to grade point averages and even school attendance rates.

The key to Math CEO’s success, Pantano explained, is in the quality of the mentor-mentee relationships the program fosters.

Take Mercedes Barriga, who was a middle school student in 2016 at nearby Lathrop Middle School when she first came to UCI to participate in the Math CEO program. The mentoring Barriga received inspired her to enroll at UCI and major in education, and as an undergraduate student she became a Math CEO mentor and remained engaged with the program throughout her entire time at UCI.

“We teach students that math isn’t just about numbers, that it can be related back to their own communities and the real world. We also emphasize the *process* of getting to an answer over the answer itself,” Barriga said. “While working as a mentor, my own philosophy towards learning changed as I understood the significance of having students engaged and involved in their own learning. Through

Math CEO, I also found a community on campus where I was able to make friends and feel like I belonged. Once, I sat in those chairs learning about math, and there I was teaching students from my own middle school. It felt good to be able to give back."

Barriga graduated with her bachelor's in 2024, and has plans to get her teaching credential so she can go back and teach at Santa Ana schools.

As for Pantano, she has big plans for Math CEO's future. Alongside Professor Sandra Simpkins from the UC Irvine School of Education, Pantano received a $1.5-million grant from the National Science Foundation to investigate the culturally responsive pedagogical practices that are central to Math CEO's success. Earlier this year, however, the NSF revoked that funding, and while a subsequent court order reinstated the funding, Pantano explained that the future of the grant is uncertain.

Pantano's mother never got to see her daughter go on to earn her degrees in math or see her become the professor of teaching she is today. Annabella passed away when Pantano was 20 after a seven-year-long battle with cancer.

Pantano remembers very vividly the final days she spent with her. "I have these beautiful memories," she said. "We had two math books, and we'd just do group theory problems for fun next to each other. I was working on her bed, and she was doing algebra problems just for fun. I have beautiful memories related to my mom and math."

Pantano carries the lesson of those times – that learning math can, with the right teacher, become a fun and engaging process – with her still. On any given day at UCI, odds are decent you'll spot Pantano on her bike darting from classroom to classroom to teach a class so she can keep sharing her theory of joy – one born decades ago on car trips with her mom.

If you're an undergraduate at UCI and have the interest, sign up to become a MathCEO mentor.

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