

# Empowering Future Educators: The Role of Service Learning in Mathematics Courses for Prospective K-12 Teacher Candidates

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## Project Description

### A Challenge

- High academic demands of math coursework
- Perceived low relevance to teaching

May contribute →

High dropout rates in teacher preparation programs

Service learning (SL) can help bridge the gap PTs experience by connecting undergraduate and school mathematics in meaningful ways. This study examines: (a) PTs' perceptions of the most valuable learning opportunities and skills gained from SL in content-focused K-12 mathematics courses or upper-division courses for teaching-track math majors, and (b) how PTs view the relevance and usefulness of SL experiences for their future careers.

## Promoting Student Success in College and Career

Opportunities of learning for PTs emerged as they participated in the SL events.

Agency	Belonging	Competence	Student Experience (Process)	Student Experience (Output)
Agency empowers students to see and value their abilities and contributions to communities; to inspire and drive meaningful actions.	Belonging refers to students' integration into a community where they contribute and feel connected.	Competence involves acquiring and applying new knowledge and skills.	Refers to students utilizing their past experiences to make choices about their present.	Refers to an outcome of student participation in an activity.
<b>See themselves as educators</b> - expressed interest in teaching.	<b>Collaboration</b> - cooperated with their peers through facilitating math activities.	<b>Real-world connections</b> - linked math concepts from class and service-learning to real-world applications/teaching.	<b>Past Connections</b> - drew on past experiences, recognizing their relevance in the current SL exp	<b>Fulfilling Experience</b> - found the SL event rewarding and meaningful.
<b>Increased confidence</b> - demonstrated increase in confidence in their (mathematical/soft-skill) abilities.	<b>Sense of belonging</b> - experienced being part of their (teaching/ personal) community.	<b>Skill Development</b> - enhanced interpersonal, adaptability, and communication skills through SL-experiences.	<b>Personal Observations</b> - Students shared past experiences informatively without making explicit connections to current SL experience.	<b>Authentic Teaching</b> - experienced real teaching with K-12 students.
<b>Practicing growth mindset</b> - embraced mistakes, learned from them, and recognized potential for improvement.	<b>Co-learning</b> - taught or learned from a peer.	<b>Teaching Insights</b> - experienced diverse strategies, pedagogy, impact of language and culture on learning.		
<b>Proactive</b> - took responsibility and initiative in preparing and planning.	<b>Networking</b> - valued the opportunity to network.			

## Community Impact

The program provided K-12 students with valuable opportunities to engage in in-depth mathematics, collaborating with faculty and Sac State students. Through these interactions, K-12 participants were not only exposed to advanced mathematical concepts but were also encouraged to see themselves as capable mathematicians, fostering a sense of ownership over their learning. By working alongside Sac State students, they were able to envision their own future academic journeys, seeing college as an attainable goal. This experience offered more than just academic enrichment—it empowered students by enhancing their confidence, broadening their perspectives on higher education, and instilling a greater sense of possibility.

Jordan Scott, Teacher at Luther Burbank High School

“Thank you again for the opportunities you have provided to our students. They had a great time, really enjoyed games and the breakout sessions, the Estimation, being on Sac State's campus, and engaging with their peers, Sac State students and faculty! thank you! Look forward to our next collaboration.”

Fernando Rodriguez, Teacher at Hiram Johnson High School

“This weekend [referring to the Saturday event at Sac State] was so great, our students were talking about it today in class.”

## Experiential Learning Opportunities

### Course Context

#### College Geometry (8)

Study of the axioms and theorems of Euclidean geometry. A comparison of several geometry axiom systems and their theorems, including those of some non-Euclidean and finite geometries.

#### Capstone Mathematics (26)

Reviews the major themes presented in the upper division program in Mathematics, and relates the themes to junior high school and high school curriculum.

#### Mathematics and Learning Process (10)

Examine mathematical concepts related to K-8 with respect to the treatment of reasoning, communication, and the perspective of cognitive and social constructivism.

Forty-four students from four SL-designated mathematics courses participated in the study. Post-survey results (N=40) showed that most students found the SL component beneficial. Thirty-five students agreed it helped develop citizenship skills, while 38 felt it increased their awareness of community responsibilities. Thirty-eight students agreed it improved problem-solving, critical thinking, and communication skills, and 34 felt it enhanced intercultural communication.

## Campus Community Impact

Regarding agency, many PTs developed a stronger connection to their future roles as teachers or began envisioning themselves pursuing teaching. They gained confidence in actively engaging with the sessions and pushed themselves beyond their comfort zones. As one PT reflected,

“I learned that I was very introverted before and would let others take that role of being involved. I have been challenging myself because of this course to step into that role more.”

Concerning belonging, PTs valued getting to know members of their community and showed a genuine interest in connecting with others on a personal level. In regards to competence, several PTs reflected on how the SL experience challenged them to make impromptu decisions and produce solutions to challenges they experienced during the SL events. One PT wrote,

“There were a lot of English Learning students that came to visit and finding ways to communicate the rules and get them involved was truly a challenge. In my group we did not have a native speaker to assist the students the best we could, but we managed to get by and adapt. I think I personally grew because of this as I was forced to find ways to communicate the material I was teaching to my visitors.”

## Community Partners

