

Mathematics Through the Lens of Service-learning

Sayonita Ghosh Hajra
Hamline University

Jen England
Hamline University

Chloe Mcelmury
Hamline University

Hani Abukar
Hamline University

In this poster, we report on a study conducted at a midwestern private liberal arts university where researchers incorporated service-learning into a non-major mathematics course. Data reveal students felt more confident learning mathematical concepts because of its real-world application in the community. Additionally, students reported an increase in the value of mathematics and its importance in societal reforms.

Keywords: mathematical anxiety, service-learning, undergraduate students, civic engagement

Many undergraduate students experience math anxiety, which often results in their being unprepared (Nagy et al., 2010; Ashcraft, 2002) to pass graduation requirements for a bachelor's degree (Bound, Lovenheim, & Turner, 2010). This leads to students developing negative attitudes toward mathematics. One strategy to combat these issues is engaging students in service learning, which can increase confidence (Soria & Thomas-Card, 2014; Soria, Nobbe, & Fink, 2013; Soria, Troisi, & Stebleton, 2012). As students communicate math skills from college classrooms to community settings, they learn practical and applicable uses of mathematics in daily life. This is particularly beneficial for low-income and first-generation students who gain self-efficacy, persistence, and college retention (Yeh, 2010). Furthermore, Schulteis (2013) argues service learning is an "excellent way to enhance the extent of student learning" by helping students develop "greater mastery of classroom material and an increase in civic values and skills" (p. 582). Indeed, there are calls to train instructors to engage in learning beyond the classroom (National Task Force on Civic Learning and Democratic Engagement, 2012; Kielsmeier, 2010) so service learning can be a requirement of college education.

We wanted to explore these opportunities through a non-major mathematics course at our midwestern private liberal arts university. The course incorporated three service learning activities, worth 10 percent of the course grade, by partnering with a local elementary school. The course was offered for one month, Monday—Friday for 3.5 hours every day. Thirty-three undergraduate students were enrolled in the course and participated in our study. Students created and revised lesson plans from the topics discussed in class and then taught the lessons to about 50 third graders. After each teaching session, university students wrote self-reflections on their experience, which were collected, analyzed, and coded as data using open coding methods (Strauss & Corbin, 1998).

Three key themes emerged from this data. First, students expressed more confidence in mathematics communication and a better understanding of its role in society. Second, students found teaching through hands-on mathematical activities more applicable to the real world, which was different than prior experiences learning in a traditional university classroom setting. Third, students reflected on becoming more aware of future generations of young(er) students; they shared hopeful statements that these elementary children would grow up to make a difference in the world because of educational opportunities like this course/study. Ultimately, our data demonstrates that service learning opportunities can transform mathematics from something scary and disconnected to a more meaningful and civically engaged area of study.

References

- Ashcraft, M. H. (2002). Math anxiety: Personal, educational, and cognitive consequences. *Directions in Psychological Science, 11*, 181–185.
- Bound, J., Lovenheim, M. F., & Turner, S. (2010). Why have college completion rates decline? An analysis of changing student preparation and collegiate resources. *American Economics Journals: Applied Economics, 2*, 129–157.
- Kielsmeier, J. (2010). Service-learning: The time is now. *Prevention Researcher, 18*(1), 3–7.
- Nagy, G., Watt, H. M. G., Eccles, J. S., Trautwein, U., Lüdtke, O., & Baumert, J. (2010). The development of students' mathematics self-concept in relation to gender: Different countries, different trajectories? *Journal of Research on Adolescence, 20*, 482–506.
- National Task Force on Civic Learning and Democratic Engagement. (2012). A crucible moment: College learning and democracy's future. Washington, DC: Association of American Colleges and Universities.
- Schulteis, M. S. (2013). Serving hope: Building service-learning into a non-major mathematics course to benefit the local community. *PRIMUS, 23*(6), 572–584.
- Soria, K. M., Troisi, J. N., & Stebleton, M. J. (2012). Reaching out, connecting within: Community service and sense of belonging among college students. *Higher Education in Review, 9*, 65–85.
- Soria, K. M., Nobbe, J., & Fink, A. (2013). Examining the intersections between undergraduates' engagement in community service and the development of socially responsible leadership. *Journal of Leadership Education, 12*(1), 117–139.
- Soria, K. M., & Thomas-Card, T. (2014). Relationships between motivations for community service participation and desire to continue service following college. *Michigan Journal of Community Service Learning, 20*(2), 53–64.
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: SAGE Publications.
- Yeh, T. L. (2010). Service-learning and persistence of low-income, first generation college students: An exploratory study. *Michigan Journal of Community Service Learning, 16*(2), 60–65.