

Fending for Themselves: Secondary Mathematics Preservice Teachers' Experiences as Outsiders in their Program



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Abstract

This study investigated the experiences of secondary mathematics preservice teachers (PSTs) as they navigated mathematics content, general education, and mathematics teaching methods courses in their teacher education program. Through a series of semi-structured interviews, we learned that PSTs felt like outsiders in their mathematics content and general education courses and leaned on each other to get through each of these components. Because of the challenges they faced in those components of their program, PSTs developed a cohort based on shared goals, experiences, and support for one another; and the mathematics teaching methods course provided a formal space to allow this cohort to thrive. We conclude by calling teacher education programs to action as they consider ways of promoting positive/inclusive experiences for PSTs.

Background and Research Question

- Academic success in post-secondary education is influenced not just by content acquisition, but student experience in their programs (van Rhijn et al., 2016)
- Secondary mathematics preservice teachers (PSTs) have substantial university-based coursework in their teacher education (TE) programs, but little is known about their experiences in these courses and how this impacts their success, self-efficacy, and future goals (Pearlman-Avni & Aloni, 2016)

Research Question: What are the experiences of secondary mathematics PSTs in the university-based components of their TE program?

Teacher Education Programs: Course Components

Secondary mathematics PSTs in TE programs typically engage in three types of courses:

- 1. General education courses:** These courses focus on “foundational” knowledge that transcends subject-specialization (Grossman et al., 2009). Courses are sometimes organized by level of schooling (e.g., secondary), but can also speak across grades (K-12). Instructors generally have classroom experience and/or advanced degrees in education, but because of the nature of the courses, their expertise does not always reflect the specific interests of PSTs enrolled in these courses.
- 2. Mathematics content courses:** These courses allow PSTs to engage in advanced mathematics—as a means of deepening their mathematical content knowledge beyond what they will be required to teach (Hodge et al., 2010). These undergraduate-level courses are taken by students across a variety of programs (e.g., biology, physics, etc.). These courses include a range of topics, and are typically taught by instructors who have advanced mathematics degrees, but no formal training in education (Leiken et al., 2018)
- 3. Secondary mathematics teaching methods courses:** These courses expose PSTs to different ways of teaching mathematics (Albayrak & Unal, 2011). These courses are primarily taken by secondary mathematics PSTs, though occasionally, students in STEM programs will enroll out of interest.

Research Context and Method

- Exploratory case study (Yin, 2009) over the course of a four-year Bachelor of Education program at a research-intensive university in Canada
- Seven secondary mathematics PSTs were interviewed multiple times throughout their program. These PSTs comprised a full graduating class of secondary mathematics specialists
- Data for this study centred around PST responses related to their experiences during coursework (general education, mathematics content, and mathematics methods courses) in their program
- Data were transcribed verbatim and iteratively coded using the constant comparative method (Kolb, 2012) and NVivo 12 for efficiency

Findings

PSTs as outsiders

- In general education courses, PSTs were numerically in the minority as mathematics educators, and both peers and instructors tended not to like and/or have experience in mathematics
- In mathematics content courses, PSTs felt intimidated by their peers, instructors, and the course content, and worried about seeming “superficial or dumb”. PSTs noted that as education students, they did not feel attended to.
- PSTs felt isolated and unwelcome in their general education and mathematics content courses, respectively
- One PST summarized their experiences in these courses as this: “In education [courses] we are still told like, ‘Oh, math? Sorry, guys,’ and then in math [courses], ‘Well, sorry, education.’”

PSTs as insiders

- Mathematics methods courses were the first and main times that PSTs felt they could cultivate community; this became critical for their persistence through the rest of their program
- PSTs felt that in these courses they could embrace both the mathematics and education sides of their professional and academic identities; they felt a sense of belonging for the first time
- Engaging in these courses allowed PSTs to draw on this community support in other courses, as well as their personal lives

Conclusions

- PSTs felt unwelcome and/or isolated in two of the major components of their university-based program: general education and mathematics content courses
- Through their mathematics methods courses, PSTs felt a sense of belonging for the first time, and out of necessity, developed a community. This community empowered the PSTs to support one another, and facilitated professional and personal growth
- The community that was self-created is akin to a cohort (Barnett & Muse, 1993) where PSTs supported one another (Bullough et al., 2001) and were able to engage in professional growth together (Beck & Kosnik, 2001)
- Teacher educators and program coordinators should consider the ways that PSTs may feel excluded from major components of their program and how this impacts their professional and personal learning
- Though our study is limited in size, we hope that these insights might inspire others to intentionally and formally facilitate ways of building community within coursework

References

- Albayrak, M., & Unal, Z. A. (2011). The effect of methods of teaching mathematics course on mathematics teaching efficacy beliefs of elementary pre-service mathematics teachers. *International Journal of Humanities and Social Science*, 1(16), 183-190.
- Barnett, B.G., & Muse, I.D. (1993). Cohort groups in educational administration: Promises and challenges. *Journal of School Leadership*, 3(4), 400-415.
- Beck, C., & Kosnik, C. (2001). From cohort to community in a preservice teacher education program. *Teaching and Teacher Education*, 17(8), 925-948.
- Bullough, R.V., Clark, D.C., Wentworth, N., & Hansen, J.M. (2001). Student cohorts, school rhythms, and teacher education. *Teacher Education Quarterly*, 28(2), 97-110.
- Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teachers & Teaching: Theory and Practice*, 15(2), 273-289.
- Hodge, A. M., Gerberry, C. V., Moss, E. R., & Staples, M. E. (2010). Purposes and perceptions: What do university mathematics professors see as their role in the education of secondary mathematics teachers?. *PRIMUM*, 20(8), 646-663.
- Leikin, R., Zazkis, R., & Meller, M. (2018). Research mathematicians as teacher educators: Focusing on mathematics for secondary mathematics teachers. *Journal of Mathematics Teacher Education*, 21(5), 451-473.
- Kolb, S. M. (2012). Grounded theory and the constant comparative method: Valid research strategies for educators. *Journal of Emerging Trends in Educational Research & Policy Studies*, 3(1), 83-86.
- Pearlman-Avni, S., & Aloni, A. (2016). The impact of a post-secondary education program on the self-efficacy and future orientation of people with high-functioning autism. *Proceedings of the 4th Eurasian Multidisciplinary Forum* (pp. 251-268). European Scientific Institute.
- van Rhijn, T. M., Lero, D. S., Bridge, K., & Fritz, V. A. (2016). Unmet needs: Challenges to success from the perspectives of mature university students. *Canadian Journal for the Study of Adult Education*, 28(1), 29-47.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th Ed.). Thousand Oaks, CA: Sage.

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