

Science Teacher Learning and Identity Development During a Summer Research Program

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OVERVIEW: Pre-service teachers often lack opportunities to develop and connect their science and science teacher identities. This study shows how a summer research experience can shift these identities from conflict to integration through authentic cross-field experiences, social interactions, and reflection.

KEYWORDS: teacher research experiences | teacher education | teacher identity | teacher professional learning

AUDIENCE: Grant funders; education programs; professional learning developers; district coordinators.

KEY POINTS

- Scientist & science teacher identities were in state of conflict at the start of the program.
- Preservice research experiences for teachers (preRETs) can promote the integration of science and science teacher identities.
- Scientist and educator partnerships enable authentic, cross-disciplinary experiences that affirm teachers’ multi-faceted identities
- The goals of preRETs should be broadened to include identity development.

INTRODUCTION Pre-service teachers often have limited opportunities to develop and reflect upon both their scientist and science teacher identities, and the relationships between them. This likely limits how they draw upon these different but complementary role identities in their teaching practice. This case study explores how a summer research experience for pre-service teachers (preRET) program could fill this gap. Research questions included: How did the role identities shift during the program? What about the program influenced these shifts? This study includes the analysis of qualitative data sources (journal entries, interview transcripts, written reflections) collected throughout the program. The Dynamic Systems Model of Role Identity (DSMRI) provided a lens for exploring these shifts and influences.

FINDINGS Findings in response to the first question illustrate the dynamic DSRMI components and emotions that emerged and evolved over the program. Findings from the second question illuminate the contextualized identity change processes supported by various program elements. The focal case’s two role identities (scientist and science teacher) were in a state of conflict and competition at the start of the preRET program. These strengthened individually and collectively throughout the program and reached greater harmony and integration by the end of the summer. Examples illustrating specific shifts in DSMRI components and emotions at the start, throughout, and end of the summer program were reported. The program promoted shifts through three crucial elements: *a. providing authentic opportunities that*

bridge the fields of science and science education, b. facilitating personal interactions within and across these two fields, and c. promoting opportunities for personal and collective reflection.

TAKEAWAYS While research experiences for teacher programs (RETs and preRETs) typically focus on knowledge and skills, this study suggests the goals should be broadened to include identity development. To do so, programs should provide opportunities that bridge the fields of science and science education, facilitate personal interactions with people within and across these two fields, and promote personal and collective reflection opportunities. Collaborative partnerships between science and science education faculty are key. Reflection around authentic science research experiences and interactions with positive role models can help pre-service teachers develop in ways that may ultimately promote their future students’ engagement and belonging in science. When a teacher’s science and science teacher identities are in a more harmonious state, it can strengthen their ability to embrace their science identity within their science teaching practice, better navigate the tensions between science as a field of practice and science as a school subject, and help students do the same. The study has methodological implications and serves as a resource for those taking a complex systems approach to explore teacher identity work, including using the DSMRI as an analytical tool. The study is also a resource for supervisors and science faculty to learn about ways to support the learning and identity development of beginning teachers who are in their classes and lab groups.