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CONTRIBUTED ARTICLE:

Author Biography

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Dr. Jess Allingham, Dr. Lindsay Blackstock, and Dr. Sharon Brewer standing in front of the Ken Lepin Science building, featuring a doe and her fawn on the hill on Thompson Rivers University campus.

From Molecules to Meaning: Our Journey into Educational Research

What makes a good chemistry role model? That's the question we set out to explore through the eyes of our students.

Context:

We are all professors who teach first-year chemistry courses at Thompson Rivers University (TRU), a medium sized university in Kamloops, BC. TRU offers baccalaureate and some master's degree programs; it also provides adult basic education and trades training, with a tradition of open access. At TRU and many institutions, addressing the attrition between first and second-year enrollment in open programs like the Bachelor of Science (Statistics Canada, 2024) is a priority.

In the Beginning:

This project began with the development of the original Role Model assignment through the United Nations Sustainable Development Goals (UNSDG) Fellowship (https://unsdgopff.opened.ca/). As UNSDG fellows, we shared a commitment to improving retention and engagement among first-year chemistry students. The project directly supports SDG4: ensuring inclusive, equitable, and quality education while promoting lifelong learning opportunities for all (United Nations, 2015).

Role models are individuals who can positively shape a student's motivation by acting as a successful exemplar (Gladstone & Cimpian, 2021). Exposure to role models has become a popular, low-cost, and adaptable strategy for increasing diversity in STEM across a wide range of contexts and student ages (Herrmann et al., 2016; Lawner et al., 2019). Effective role models are characterized by perceived competence, perceived similarity, and perceived attainability (Gladstone & Cimpian, 2021). However, the literature noticeably lacks reports on student-selected role models, a gap this study seeks to address. In our Role Model assignment, students were tasked to identify an individual who has contributed to the field of chemistry or who uses chemistry in their field that they personally relate to as a role model. Students then share their choice with the class, engage in peer discussion, and ultimately present themselves as future chemistry role models for first-year students. This bottom-up approach contrasts with traditional role model interventions, which often prescribe who is noteworthy, and with general chemistry textbooks that tend to highlight a narrow set of scientists, overlooking the diversity of the field (Lucy, 2022; Shah, 2020; Ries, 2022).

Alongside developing and implementing the new assignment, we also joined the Canadian Consortium of Science Equity Scholars (CCSES) (https://scienceequityscholars.ca/). Through this initiative, we administered surveys in first-year chemistry courses aimed at addressing systemic barriers to student success, strengthening students' sense of belonging in science, and gathering evidence for inclusive teaching practices. These surveys, which examined both social and disciplinary belonging, prompted us to consider how the Role Model assignment might influence students' sense of belonging in chemistry. Before assessing this impact, however, we first sought to understand which role models students looked to.

The CCSES surveys sparked our curiosity, and the assignment provided a metric to analyze, but we lacked frameworks to guide our investigation. That changed when we joined the inaugural Scholarship of Teaching and Learning (SoTL) Scholars Development and Grant program at TRU. Through this program, we collaborated with CELT faculty who supported us in developing research questions, applying for ethics approval, selecting theoretical frameworks, and conducting thematic analysis.

Our Research Project:

This study investigated how students in first-year chemistry courses engaged with role models in the field, focusing on whom they selected, which personal and professional details they emphasized, and how they conveyed each figure's contributions to chemistry. We also examined how students connected these role models to their own academic and personal journeys.

Data Collection:

This research took place within the winter (Jan – Apr 2024) semester first year general chemistry course. Typical enrollment is 300 students across 4 sections. The Role Model assignment was launched on the first day of classes and was woven through the curriculum across the term. Students could choose to publicly post their artifacts. We sampled those available (https://relatingtorolemodels.trubox.ca/) and collected excerpts which were then coded and analyzed.

Data Analysis:

We employed a combination of thematic analysis (Braun & Clarke, 2006, 2019) and grounded theory methodology (Charmaz, 2014) to identify recurring patterns of meaning while remaining open to theory development emerging directly from the data. As physical scientists accustomed to the linearity of the scientific method, this inductive, iterative approach initially felt disorienting – like attempting to write with our non-dominant hand – because it inverted our usual process by letting the data lead rather than starting with a hypothesis. Nonetheless, this methodology was particularly well-suited to our aims, as it enabled us to capture the nuanced ways students in first-year chemistry courses chose and represented role models, the contextual details they deemed important, the contributions they highlighted, and the personal significance they ascribed to these individuals. By embracing this qualitative lens, we were able to uncover layered insights that a purely quantitative or deductive approach would likely have overlooked.

The insights and findings from this rich data set have led to a manuscript currently in preparation which will further detail methodology and results from this project with implications to influence teaching practice.

Reflections

Pedagogical Reflection

Learning who students select as their role model and why has informed, and will continue to inform, our teaching practice. Discovering the primary themes that emerged from students' artifacts has the potential

to pivot how we design applied examples, ensuring they resonate more deeply with students' lived experiences and aspirations.

The assignment encouraged students to explore and showcase role models who inspire them in the context of chemistry, sparking lively and thoughtful discourse on the classroom forum. Students engaged deeply with their peers' artifacts, often commenting on how others' chosen role models affected their own perspectives and academic motivations. This peer-to-peer engagement fostered a deeper sense of community, empathy, and mutual inspiration, key elements of an inclusive and supportive learning environment.

Reflection on Our Process

Our process was strengthened by working within a smaller, close-knit team embedded in a larger cohort as part of the SoTL Scholars Development and Grant program at TRU. This dual structure allowed us to benefit from the breadth of perspectives across disciplines while also cultivating the intimacy and efficiency of a smaller working group. Insights from larger SoTL Scholars cohort meetings enriched our project, as each team member brought unique expertise and reflections to the table.

Collaboration proved to be one of our greatest assets. Sharing a workspace and prioritizing open communication enabled a smooth, equitable workflow. By aligning tasks with individual strengths, we managed complex responsibilities without compromising quality. This structure allowed us to support one another through scheduling challenges, ensuring no one was overburdened.

This research has led to exciting new opportunities, side projects, interdisciplinary partnerships, and a growing network of like-minded colleagues. Together, we've built a community that is supportive and lays the foundation for future initiatives, and our accountability to each other strengthens our commitment to disseminate.

Our journey closely mirrored Tuckman and Jensen's (2010) stages of small-group development: forming (coming together), storming (navigating challenges), norming (developing trust), performing (working efficiently), and adjourning (transitioning between projects). As Baldwin and Chang (2007) note, collaboration is both a process of learning together and learning how to collaborate effectively. Our experience reinforced that these two forms of learning are inseparable. Similarly, Bennett and Gadlin (2012) emphasize that successful team science requires trust, clear communication, and a shared vision, elements that became the foundation of our group's productivity and cohesion.

As novice SoTL researchers, we navigated challenges together, learning not only new methodologies but also how to adapt our scientific mindsets to qualitative inquiry. Our shared philosophy on pedagogy kept us united in purpose, even when our perspectives differed, resulting in a cohesive and thoughtful product. This collective journey, grounded in community support and mutual encouragement, allowed us to grow both individually and collectively. Our shared philosophy on pedagogy kept us united in purpose, even when our perspectives differed, resulting in a cohesive and thoughtful product.

Note – Our Role Model assignment can be found here:
https://relatingtorolemodels.trubox.ca/category/the-assignment/

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52nd College Chemistry Canada Conference

Chemistry for All

Nunavut Arctic College
Nunatta Campus

Iqaluit, NU
29 May – 01 June 2026

Details for the 2026 College Chemistry Canada Conference can be found at the conference website.
Registration and abstract submission is now open!

2YC3 Affiliate Conference Dates

Conference 2026

May 29-30, 2026
Montgomery College, Takoma Park-Silver Spring Campus
Maryland

Conference Website: 2YC3 226th Conference

Conference 2027

May 28-29, 2027
Perimeter College Campus, Georgia State University
Georgia

Conference 2028

May 26-27, 2028
Temple College
Texas

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