

Mentorship Matters: Development of a Framework of Mentoring Activities that Impact STEM Undergraduate Student Professional Formation

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ABSTRACT

This study seeks to investigate how engagement in peer or near-peer mentorship impacts STEM undergraduate student professional formation in terms of STEM identity construction and professional development. Towards that end, this study will identify and characterize the mentoring activities associated with effective mentoring relationships and the factors that may influence perceived mentoring effectiveness for the relational partners. Findings will assist in the development of a conceptual framework of effective mentoring activities for STEM identity construction and professional development.

RESEARCH AIMS

- Investigate STEM undergraduate student professional formation in terms of STEM identity construction and professional development through engagement with peer and near-peer mentoring in formal and informal mentorship programs.
 - Identify and characterize:
 - the mentoring activities that mentors and mentees engage in within these contexts.
 - the factors that the relational partners perceive as enhancing or hindering mentoring quality and effectiveness.
 - Identify which activities are perceived as most effective for either STEM identity construction or professional development and if there is a difference based on the identified factors.
- Develop a conceptual framework of mentoring activities and factors that impact the professional formation of STEM undergraduate students involved in peer and near-peer mentoring and compare it to the literature.

STUDY DESIGN

The study will have a complex mixed methods design with two sequential-dependent phases. Phase one will include pre-, mid-, and post-surveys with both quantitative and qualitative items, while phase two will be entirely qualitative, using semi-structured follow-up interviews based on participant survey responses. This design was selected to allow for changes to participant STEM identity and professional development to be tracked over the course of the mentoring experience quantitatively while collecting rich, qualitative data regarding both how participants perceived those changes and how participants' perceptions changed over time, and then to explain these findings through follow-up interviews. All data will be collected via online platforms (Qualtrics and Zoom).

EXPECTED OUTCOMES

This study is expected to provide an improved understanding of STEM undergraduate student professional formation as impacted by mentorship experiences. The primary anticipated output of this study is a conceptual framework of effective mentoring activities for STEM identity construction and professional development. Findings will be disseminated through the dissertation document and dissertation defense. Findings may also be disseminated through conference papers, conference presentations, and referred journal articles.

TENTATIVE TIMELINE

- Data Collection: Summer 2025 / Fall 2025
- Data Analysis: Fall 2025 / Spring 2026
- Dissertation Defense: Spring 2026