Advancing Science Identity in STEM Graduate Programs through Holistic Mentoring, Writing to Learn, & Science Communication

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This material is based upon work supported by the National Science Foundation under Grant No. 1806323. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."

Introduction

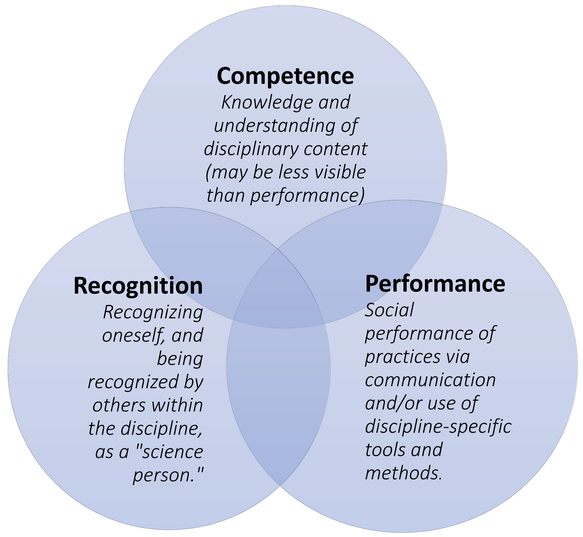
Developing science leaders from underrepresented minority (URM) graduate students remains a national priority. Minority-serving institutions are uniquely poised to foster diverse science leaders, but they also require a systematic, integrated, program-wide approach geared toward nurturing and validating students' identities as scientists.

Interventions

A series of graduate courses, professional workshops, and community-based activities that seek to foster and validate underrepresented minority students' science identity through holistic mentoring, writing to learn, and science communication.

Objectives

1. **Holistic Mentoring**: Increase the academic performance, persistence, and graduation of URM graduate students; and increase URM students' self efficacy, performance, and leadership skills.
2. **Writing to Learn**: Improve content learning for all graduate students by integrating student writing across the ESE curriculum, with particular attention to the writing of URM graduate students.
3. Improve **Science Communication** to scientific and public audiences by engaging in mutual learning and public deliberation, especially URM graduate students.



Key Findings

- **Sci/Comm connects components of sci/identity; sci/comm is identity forming;**

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- **Holistic mentoring is crucial for providing recognition of FirstGen URM students.**

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- **Need further research at the graduate level on WTL as a measure of competence**

Engagement in sci/comm projects allows students to **PERFORM** their research to diverse audiences and make personal/cultural connections with their research. **#multiple genres create dexterity; #social media is public relevance; #sci/comm allows performance of expertise to relevant stakeholders as recognition**

Mentoring provides **RECOGNITION** of achievements and self-reflection on personal/academic challenges involved in becoming a scientist. **#normalizing struggle #validation of skills; #peertopeer/cohort mentoring**

Development of Sci/identity is non-linear with advances and set backs as competence increases. **#firstgen URM students; #sci identity; #connecting research and practice.**

Writing to learn for Measurable **COMPETENCE**. Experimental Design of WTL on Thesis Proposals, Drafts, and Defense. Weekly Lab Writing, Peer Review, Multiple Drafts.

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Graduate Writing Fellows: In-course peer-to-peer writing help in first-year graduate courses. Workshops by Anne Ruggles Gere and Ginger Schultz. Further Multi-Institutional WTL Grants. (Gere, et.al., 2019; Moon, Gere, and Schultz, 2018; Halim, et.al., 2018).

*The UTSA **Tuggle Scholars Program** is dedicated to mentoring and training graduate students who aspire to become leaders in environmental science and ecology. The program provides interdisciplinary support for students through research, mentoring, and science communication activities that develop students' ability to communicate their expertise to a range of audiences, via a range of media.*

Conclusions & Next Steps

- Interventions are positive contributors to science identity; but we need more long-term data and statistical power (i.e. multiple cohorts after graduation)
- Cultivating a culture of writing within depts./colleges requires substantive commitment, infrastructure, and strong relationships
- Continue to build support for culturally responsive pedagogy as a component of validation

Acknowledgements: We thank the NSF-IGE program for funding. For WTL mentoring we are grateful to Anne Ruggles Gere and Ginger Schultz. Special thanks to Juliet Ray, Julian Chavez, Gwen Young, and the entire UTSA ESE department team. Thanks to Tyra Allen and Robin Fletcher for media production.

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