



Improving **U**ndergraduate **S**TEM **E**ducation **Initiative**



Advancing Interdisciplinary Undergraduate STEM Education for Increased Workforce Preparation

Galina Madjaroff Reitz, Ph.D.
Lola Rodríguez-Vargas, Ph.D.



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AAAS IUSE Initiative

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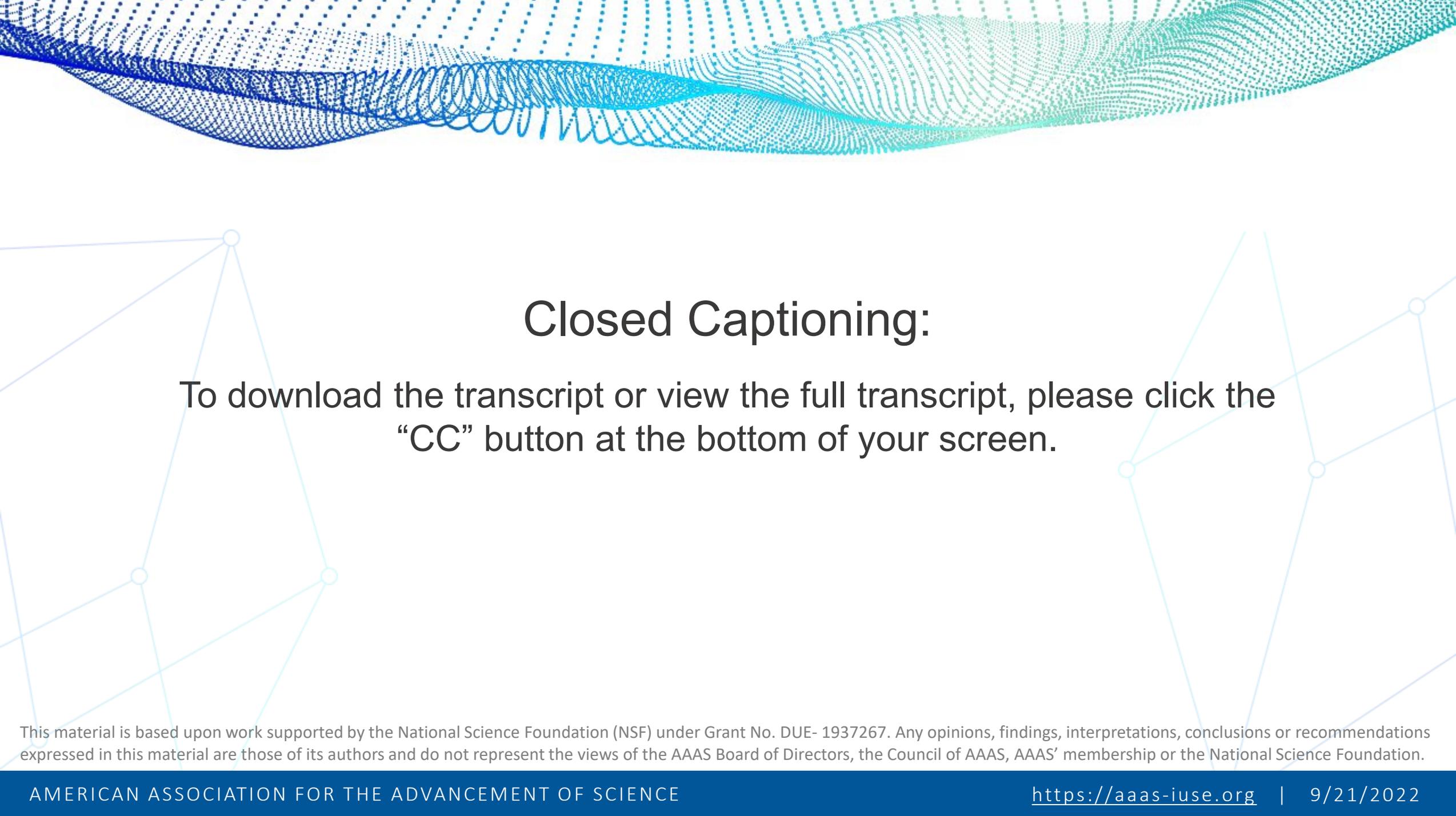
WORKSHOP



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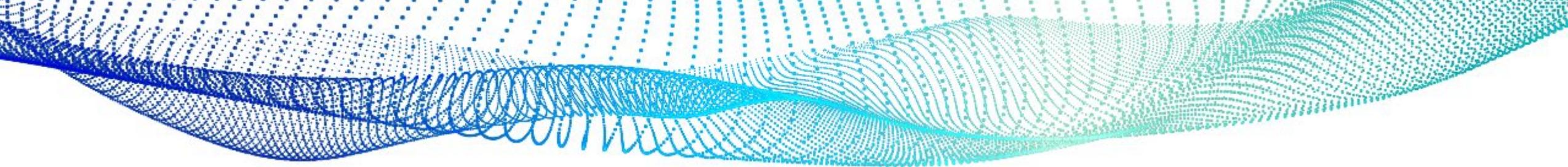
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The AAAS-IUSE initiative supports faculty, students, and the greater undergraduate STEM education community by disseminating research and knowledge about STEM teaching, learning, equity and institutional transformation.

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WORKSHOP

Preparing students for success through interdisciplinary STEM education

Dr. Galina Reitz
University of Maryland



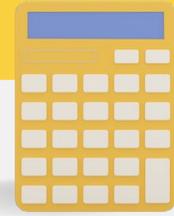
Who we are



Technology



People



Information



teaches students skills in technical areas such as **database design, information architecture, web/mobile development, data analytics, and cybersecurity** alongside areas of the **social sciences, leadership, and the humanities** – addressing the growing and unique need for information professionals who understand complex social and organizational issues.



**broad range of
classes but...**

cybersecurity/privacy

data science

digital curation

health information

A gap in our curriculum

the birth of TIL and iREP

Allow students to tailor their course load and develop expert level skills within specific career paths



Technology Innovation Leadership

By combining creative **leadership**, design thinking and understanding **socio technical** challenges, this undergraduate minor prepares students to tackle large scale **problems** relating to technology **innovation**. While using innovative thinking approaches, students will learn to create new ideas and energy and solve socio technical challenges through leadership experiences.

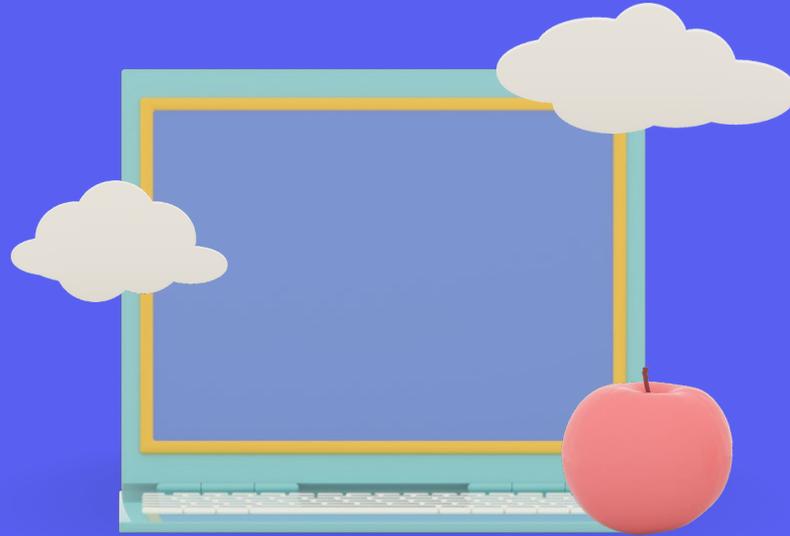


Information Risk Management, Ethics and Privacy

This undergraduate minor prepares students to evaluate major **information and big data privacy** and **security issues** that businesses and individuals encounter. Students will focus on practical strategies to **mitigate risks** and explore the ways emerging technologies benefit in the context of risk management, **ethics**, and **privacy**.



Leveraging partners



Provide career focused skills

Panels
Mock interviews
Negotiation skills
Resume
Real projects
Recruiter meetings
LinkedIn
Visits
Research and
practice



Strengths based approach

Thank you!



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Advancing Interdisciplinary Undergraduate STEM
Education for Increased Workforce Preparation

Interdisciplinary Capstone Projects for STEM students

September 21, 2022 2:00 PM-3:30 PM

by Lola Rodríguez Vargas, Ph.D. *she/her/ella*
Director, CREAR Societal Impact Groups
The University of Arizona



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Improving Undergraduate
STEM Education Initiative



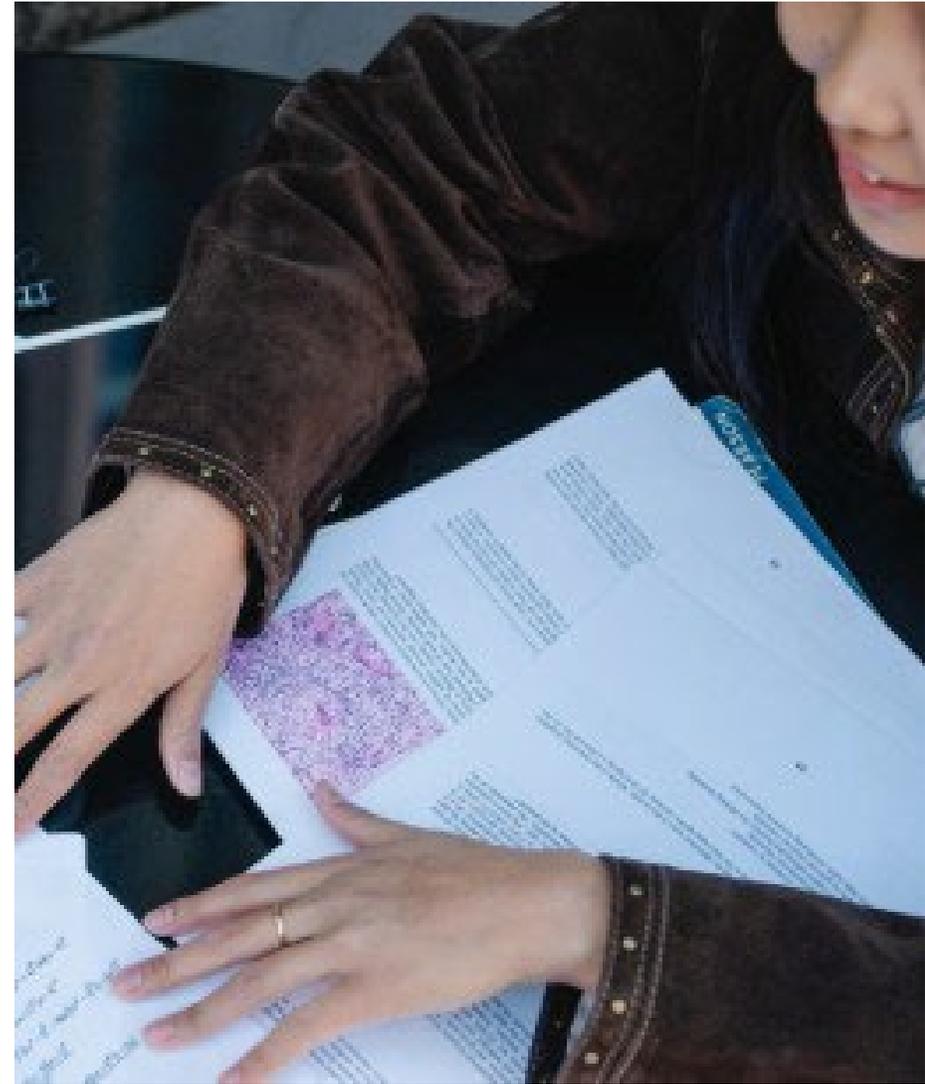


Overview

- Introduction
- Problem
- Related Literature
- Exercise
- Learning Outcomes & Method of Assessment
- Findings
- Conclusion
- Application

Introduction

Higher education institutions (HEIs) can nurture historically underserved STEM student success by providing deep learning experiences that equip students with the skills necessary for them to solve contemporary problems and contribute to their communities and society (Spellings, 2006). Corson (2001) refers to equity as justice and fairness that recognizes that persons from specific social locations possess inherent access to societal privileges providing them with a likelihood to achieve outcomes that other persons do not.



Problem

This capstone design intended to continue to expand the access of Latinx students to High Impact Practices (HIPs), as well as HIPs delivered in a culturally responsive way. Culturally responsive pedagogy and practices (CRPs) consider, engage, and center students' cultural knowledge and life experiences (Ladson-Billings, 2014; Obiakor, 2008). CRPs validate and build on the previous knowledge the students bring with them from their communities. This approach creates an environment where the cultural identity, in this project, the Latinx ethnic identities, were the lens utilized to assess normative behaviors and learning expectations, as well as to create and facilitate effective conditions for learning (Castagno & Brayboy, 2008; Delpit, 2006; Gay, 2018; King, 2004; Moll, 2006; Paris, 2012). The capstone project design was anchored in three learning and motivation theories: self-determination theory (SDT), transformational learning, and implicit self-theory. These theories emphasize the importance of intrinsic motivation, the role of the learner and their context in their learning, and the developmental capacity to learn and grow.

Related Literature

- Latinx students are among the student groups that have less access to deep learning experiences, as well as a higher potential to benefit from high-impact practices (HIPs) Finley and McNair (2013).
- Deep learning experiences can be provided through HIPs to Latinx students.
- Although these experiences can be more beneficial to underserved student populations (Finley & McNair, 2013), access and participation may be more challenging within these groups (Kuh et al., 2008; Stebleton & Schmidt, 2010).
- Latinx students in HED, and more specifically in 2-year institutions, can greatly benefit from the implementation of HIPs designed to address the barriers to equitable access and participation in these practices.

Exercise

1

What is the context?

What is the context of my university or program?

(What is possible?)

2

Who are the students?

Intentional design

3

How does this program align with college to career?

What are the desirable outcomes?

Learning Outcomes & Method of Assessment

01

Create an original research design by conceptualizing research design methods, identifying a research problem, formulating research questions, developing research hypotheses, and applying appropriate research analysis techniques.

Research proposal and academic poster presentation at a research symposium

02

Design a research poster that will include an introduction, literature review, methods, results, and discussion of the study.

In-class oral presentations and research symposium.

03

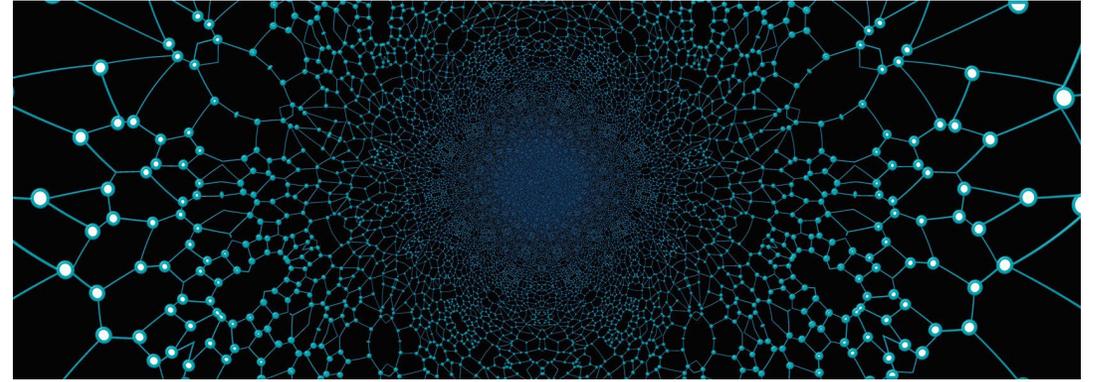
Present a research poster that will include an introduction, literature review, methods, results, and discussion of the study.

In-class oral presentations and research symposium.

Learning Outcomes & Method of Assessment

<p>04 Analyze and synthesize relevant literature in the selected research field.</p>	<p>Proposal, academic poster, introduction, literature review, discussion sections.</p>
<p>05 Examine the role of identity in knowledge production.</p>	<p>Course reflection, peer feedback, and class discussions.</p>
<p>06 Analyze how their own lens of viewing the world and their knowledge is a key factor in their future as professionals in the manner they integrate their own cultural wealth to problem-solving and innovation.</p>	<p>Course reflection, peer feedback, and class discussions.</p>

Findings

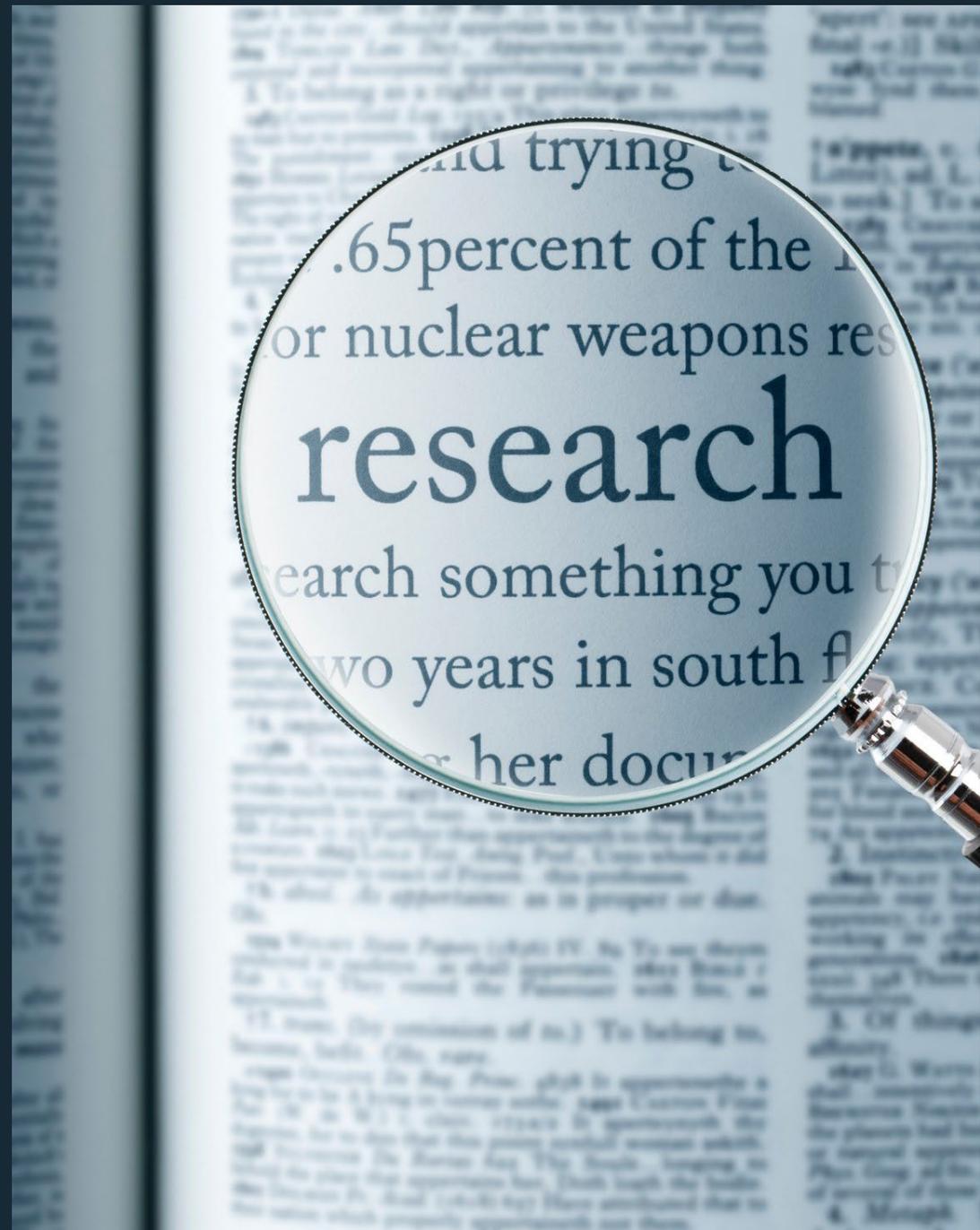


The implementation of this culturally responsive capstone provided several immediate outcomes which included:

- increased access to academic and career opportunities,
- internship eligibility,
- smoother process for transfer,
- networking with peers and mentors

Conclusion

The design and implementation of this capstone course increased the access of Latinx students to undergraduate research programming that was designed with their context in mind. Their participation in the project was measured through the monitoring of their progression, academic performance, transfer, and testimonials.



Application



Overview of steps

- Consider the institutional context
- Design with the students in mind
- Remember to establish a clear purpose
- Elaborate learning outcomes
- Collaborate with campus and community partners

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Gracias.

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2. Self-select into your breakout group based on topic interest

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Discussion Breakout Room Recap

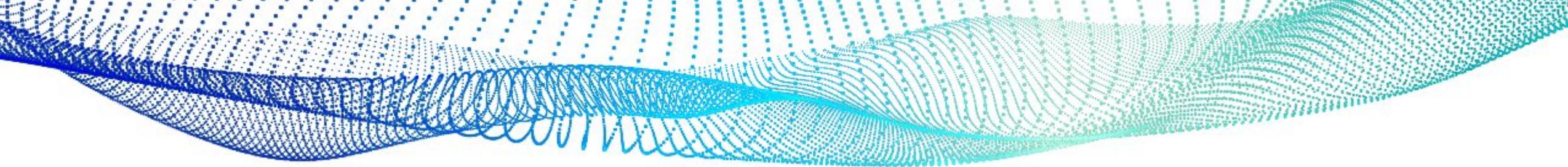


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Thank you for attending!

Slides and recording will be available in the coming weeks.

We value your feedback, please take a few minutes to complete the survey.



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