Demystifying Theoretical Frameworks for a Study of Persistence in STEM

Erika Zocher, Dr. Nicole LaDue, Dr. Daryl Dugas
“It takes a resilient sense of efficacy to override the numerous dissuading impediments to significant accomplishments.” (Bandura, 1986, p. 1177)

https://dribbble.com/shots/3740021-Intel-Mountain-Climbing-Illustration
A PERSISTENCE PROBLEM

A study tracking 17,000 post-secondary students in the United States and Puerto Rico found that only two-fifths of those who enrolled in a STEM discipline went on to obtain a degree in the field, or were still studying for one 6 years later.

**STEM AVERAGE**

<table>
<thead>
<tr>
<th>Stayed in STEM</th>
<th>Switched to non-STEM field</th>
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<tbody>
<tr>
<td>41%</td>
<td>31</td>
<td>29</td>
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**ENGINEERING**

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<tbody>
<tr>
<td>49</td>
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<td>26</td>
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**PHYSICAL SCIENCES**

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<td>43</td>
<td>40</td>
<td>17</td>
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**LIFE SCIENCES**

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**MATHS**

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**COMPUTER SCIENCES**

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STEM AVERAGE

- Stayed in STEM: 41%
- Switched to non-STEM field: 31%
- Left without a degree: 29%

~60% LEAVING STEM!
BELONG in STEM Scholars Program
Building Engagement in Laboratories, Networking, and Peer Groups

(PELL-eligible, >3.0 GPA)

Scholars

Academic support

Professional development

Social support

Persistence in STEM!

S-STEM Grant No. 1834076
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Building Engagement in Laboratories, Networking, and Peer Groups

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Persistence in STEM!

S-STEM Grant No. 1834076
Longitudinal Study: Persistence in STEM

Case study: Social support in peer group

1 semester

5 years
Project landscape

Longitudinal Study: Persistence in STEM

Case study: Social support in peer group

1 semester

5 years
PERSISTENCE

Social Cognitive Theory (Bandura, 1986)

Social Cognitive Career Theory (Lent et al., 1994)

Theory of Departure (Tinto, 1975)

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Reflection
Goals
Environment
Behavior
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Career choices

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External influences
Belief systems
Emerging adulthood

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Crossroads
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Case Study Methodology

COMMUNITY/SENSE OF BELONGING

SUPPORTS/CHALLENGES
Students’ **Lived Experiences**

- Life stories leading up to entering the program

**Interviews**

**COMMUNITY/SENSE OF BELONGING**

**SUPPORTS/CHALLENGES**

**Fall 2019 Timeline**
- August
Case Study Methodology

Observed Experiences
• Researcher’s viewpoints and reflections

COMMUNITY/SENSE OF BELONGING

SUPPORTS/CHALLENGES

Interviews

Researcher Journals

Fall 2019 Timeline

August

September - December

*Weekly meetings

Researcher Journals

Interviews
Shared Experiences

- Student’s reflections and opinions about the group
Case Study Methodology

*No data collected during weekly meetings

Interviews

COMMUNITY/SENSE OF BELONGING

SUPPORTS/CHALLENGES

Focus Group

Researcher Journals

Fall 2019 Timeline

*Weekly meetings

August

September - December

December

No data collected during weekly meetings
1. What sources of support do students commonly reference prior to the program?

2. What challenges do students commonly reference prior to the program?
– Question (from interview guide): “School can be tough! Who/where do you turn to for support?”

– Excerpt: “…There is that one person [who] always… stays in touch with me a lot, and that would be my high school teacher… the psychology teacher. I always let her know what's up [laugher]. She's always there. If anything, I call her my second mom… It feels amazing, because I know I'm not alone. Definitely would think that you're alone in most of these cases, but you're actually really supported and difficulties will come your way. But it just makes you stronger. And having those right people at the right time definitely fuels that strength that you can prosper and get out of whatever hole you're in.” –Juan (pseudonym), male, age 20
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BELONG in STEM Scholars Program

Grant # 1834076

Knowledge Generation

- Educational Psychologist
  - Dr. Daryl Dugas

- Geoscience Education Researcher
  - Dr. Nicole LaDue

- Qualitative Researcher
  - Dr. Laura Johnson

Program Evaluation

- Dr. Todd Reeves

Academic support

Social support

Professional development
Moving Forward

- Multiple frameworks $\rightarrow$ program decision-making + methodology
- Qualitative research $\rightarrow$ the **WHY** of persistence in STEM
- Weekly meetings have begun! Stay tuned.
Contact & Questions?

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NIU BELONG in STEM Scholars program page:
https://tinyurl.com/BELONGINSTEM

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Interested?  Graduate Research Assistantships available for Fall 2020.
Demographics

Gender
- Female: 58%
- Male: 42%

Race
- White: 67%
- Black or African American: 8%
- Asian: 8%
- Two or more races: 17%

Age
- 18-21: 83%
- 22-24: 9%
- 25-27: 8%

Current Status
- NIU Student: 50%
- Transfer Student: 50%

Hispanic/Latino?
- Yes: 20%
- No: 80%

Current Status
- Yes: 50%
- No: 50%

First generation?
- Yes: 50%
- No: 50%

n = 12