Implications of physics identity research for effective instruction

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The STEM TI is a cross-college collaboration to support research and development in effective, evidence-based teaching practices in Science, Technology, Engineering & Mathematics (and related!) areas, including in K-12 teacher preparation.

Currently housed in AHC4, permanent home in VH. Homepage at stem.fiu.edu.

10 faculty members and ~30 other scientists, staff, graduate students, master teachers, and others.
FIU’s STEM Transformation Institute
Programs and Events

- **STEM-TI Faculty Fellows program**: a way to be connected to the Institute and get involved in evidence-based teaching.

- Annual one day **STEMPosium** hosted in January/February each year, with an annual theme in some area of teaching and learning.

- **DBER Meetings**: bi-weekly meetings with a focused speaker or discussion on various discipline-based education research topics.

- **HHMI Faculty Scholars**: a program to support ($) faculty to reform courses.

- Oversight of the **Learning Assistant Program**.
Introduction
Physics identity and participation in physics

- A lot of research has looked at how to support students’ content learning in STEM, with much success.¹
- Despite this success, several STEM fields (physics included) haven’t grown very much, and continue to have low persistence in college.²
- Further, several STEM fields continue to have little diversity in many senses.³
- Why? Part of the answer lies in understanding students’ attitudes, motivations, and identities (e.g. “affect”).⁴
- Identity has been shown to be strongly predictive of students’ career choices.⁵

Physics Identity Development
Theoretical framework


• **Performance/competence beliefs** have a negative direct path to physics identity (and positive indirect paths).

• **Recognition beliefs** are the strongest direct predictor of a physics identity.
Physics Identity Development

Results

- The model including only women looks very similar except the negative path from **performance/competence** beliefs to identity is even more negative.
Physics Identity Development

Interpretation

- Recognition beliefs are the strongest predictor of a physics identity, for all students.
- Feeling competent or able to perform in physics is, on its own, not associated to an improved physics identity (in fact, on its own it may be negative).
- This should help us prioritize which physics experiences we try to ensure that students have.
Practical Implications
Putting research into practice

• Classroom situated in AHC5 (rm 201/203; 212 is similar); course integrates lecture and laboratory
Practical Implications
Putting research into practice

- Students spend most of their discussion circle time explaining to one another (“recognition opportunities”)

![Image of students discussing](image.jpg)
Practical Implications
Putting research into practice

- Students spend most of their discussion circle time explaining to one another (“recognition opportunities”)
Practical Implications
Putting research into practice

• I don’t lecture (ever).
Practical Implications
Putting research into practice

• Students learn to figure out a lot of their own problems; take ownership over learning.
Practical Implications
Putting research into practice

• We have highly-qualified TAs and LAs!