What Counts in Laboratories: Toward a Practice-Based Identity Survey

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Survey Development Process

★ Focus on the students' interpretations and understanding of physics and lab practices

★ Retain close ties to the theoretical framework throughout

Theoretical Framework
- Negotiated Experience + Recognition (NER), Learning Trajectory + Interest (LTI), Community Membership + Competence (CMC)
- Lab Practices

Interviews
- How do students interpret physics practices?
- Do they make identity statements around the practices?
- Mapping interpretations and how they talk about identity

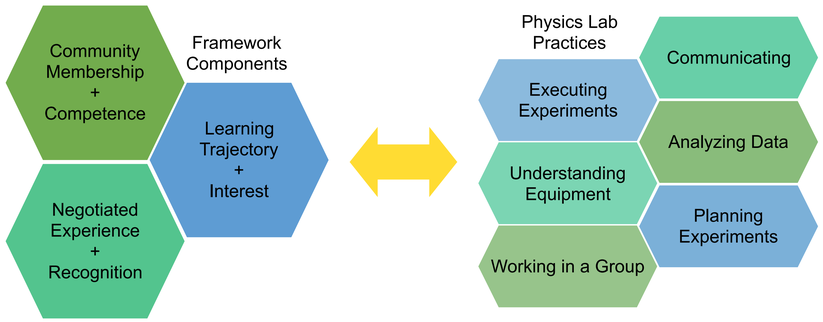
Pilot Survey
- 108 questions from interview analysis, free and closed response
- 500 survey participants
- Dimensional reduction
- Identity analysis

The focus on physics practices in lab courses makes them an ideal place to measure the impact they have on our student's. We are developing a survey to measure this impact on their physics identity.

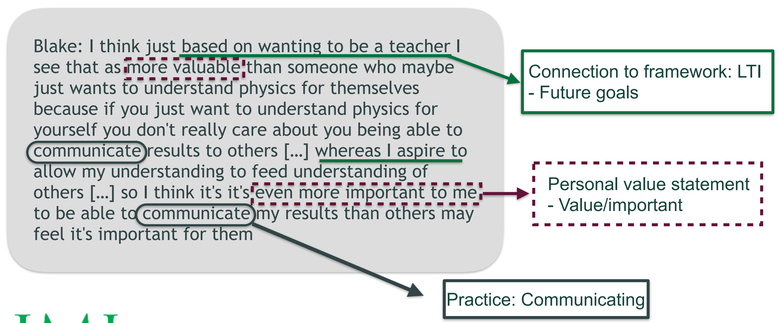
Identity

- Our framework on physics identity is the interaction between the physics lab practices[1] and identity components from Close[2] (adapted communities of practice[3] and the framework from Hazari[4] and Carlone[5])

Physics Identity

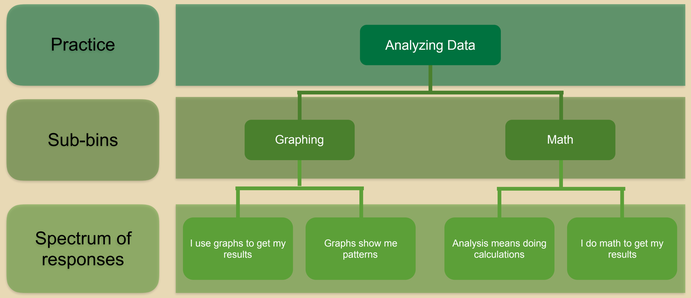


- We required three components in an identity statement:
  - Addresses the practice
  - Applies a personal value statement to it
  - Connects back to a component of our physics identity framework
- The statements from the interviews tended to lack that third component, which lead into the development of a pilot survey



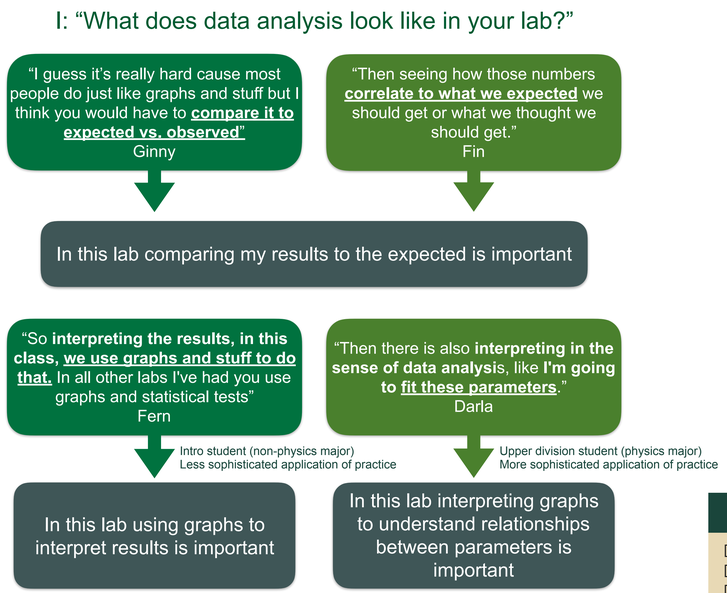
Interview Analysis

- In analyzing the interviews for the student's interpretations of the lab practices we found that within each practice responses fell into different sub-bins related to the larger practice



★ Through the interview analysis we created 108 question statements that covered the interpretations of the practices seen in the interviews

★ We were also looking at how students identified with respect to the lab practices



Pilot Survey

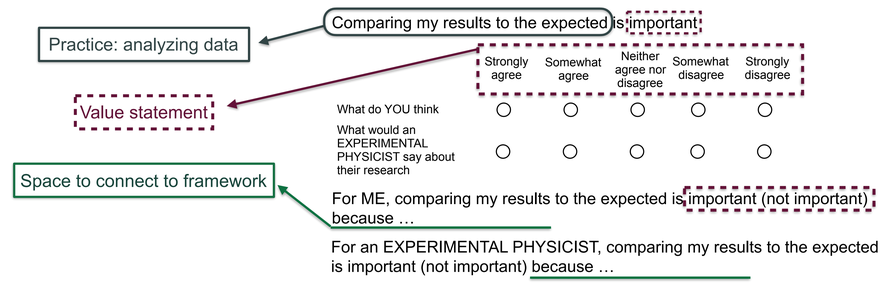
★ Goal 1: Elicit identity statements that meet all 3 of our requirements

Solution
- Questions contain first two
- Free response to elicit third
- Each question in four parts

★ Goal 2: Verify coverage of student interpretations of practices

Goal 3: Reduce the number of questions

Solution
- Distributed to 650 students (80% response rate)
- Enough responses to
  - Verify interpretations
  - Justify removing questions



Looking Ahead

- We have examples from two sets of questions under analyzing data where more sophisticated applications and/or descriptions of the practices elicit more identity statements
  - In one case the more sophisticated question came from an upper division student. The other came from an expert.
- In our effort to operationalize the identity framework we are examining identity statements for distinguishing characteristics in the components of the framework
- New survey draft

References
[1] AAPT, Report p. 29 (2014), ISSN 0031-921X.
[2] Close, E. W., Close, H. G., & Donnelly, D. (2013)
[3] Wenger, E. (1999)
[4] Hazari, Z., Sonnert, G., Sadler, P. M., & Shanahan, M.-C. (2010)
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