



HOW DO 2-YEAR COLLEGE STUDENTS VIEW THEMSELVES AS STEM LEARNERS?

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EXPANDING STEM TALENT
through Upward Transfer

Study Design

- Part of a longitudinal (2014-2018), mixed methods study seeking to examine what influences student transfer in STEM fields
- Research sites including two comprehensive community colleges and all 2-year campuses within the state university system in a Midwestern State
- Study sample consisting of 37 first-time students beginning in STEM programs or courses in Fall 2014
- Semi-structured individual interviews conducted during Summer 2015
- Constructivist approach to grounded theory

Progress to Date

- Two analysis phases of coding for 17 transcripts
 - Initial coding: open coding scheme; each transcript coded by multiple researchers
 - Focused coding: identify categories and themes through discussion among all researchers
- Validation techniques: combination of member checks, peer debriefing, and survey data triangulation (next steps)
- Constant comparative approach to coding and development of the conceptual framework on 2-year college students' self-perceptions as STEM learners
- On-going analysis of the remaining interviews for continued theory refinement until reaching saturation

Introduction

- The critical role of 2-year colleges in growing and diversifying the STEM pipeline (Hagedorn & Purnamasari, 2012; Hoffman, Starobin, Laanan, & Rivera, 2010; Wang, 2015)
- Gap between high STEM aspirations and low STEM completion and transfer rates (PCAST, 2012; Wang, 2015)
- Pivotal to tackle the gap by addressing classroom learning—2-year college students' primary way to engage with college (Hagedorn & DuBray, 2010; Hagedorn & Kress, 2008); however, knowledge base underdeveloped on how to best facilitate students' STEM learning experiences
- A key stepping stone to fill the gaps—first understand how students perceive themselves as learners in a STEM context, which helps identify potential spaces for constructing effective teaching practices and meaningful learning experiences



Research Question

How do 2-year college students perceive themselves as learners in STEM classes and programs?

EMERGING FINDINGS

Kanda: We're different but we figured out that it's our differences that make us unique, make us important and can bring a little bit of a new perspective to IT and through problem solving and through programming

Perceived Differences Compared to Peers

- Age
- Gender
- Disability status
- Maturity

Kanda: If it wasn't for [the college], I'd probably still be in the same boat where it's just like, I don't think I could ever become something more because I just didn't know I could do more

Tom: [My instructor] said, "I noticed that you did improve in your time in the class. You were asking questions. You were participating in my class." That's why he gave me a better grade. That was nice.

External Validation

- Milestone accomplishment:
- Earning a good grade
 - Passing midterm/finals
 - Completing a course

Self-Perception as STEM Learner

Internal Process of Coming to Terms with the Rewards & Challenges of STEM subjects

- STEM challenging but enjoyable
- Seeking strategies to overcome barriers

Self-Perception as Math Learner

Jennifer: When I was in high school, my math teacher said I would never accomplish anything in math because I was so bad at it. ... now I'm an A student in math and I can't believe it, but it also helps to have encouragement and not saying you'll never exceed at anything like that. And also a little bit of proving her wrong goes a long way for that.

Gwyneth: There's definitely more pressure in the science classes so it is, it does push me a little bit harder I think, but that's good. I mean I'm still learning and growing and it's a little more challenging for me

Interview Participants

Pseudonym	Race/Ethnicity	Program of Study	Active Learning Scale Score
Elizabeth	Asian	PHYS	3.33
Seamus	Multiracial	BIO/AG/ENV	4.47
Lotty	White	ENG	3.40
Katy	White	PHYS	2.27
Stella	White	BIO/AG/ENV	3.40
Kelly	White	BIO/AG/ENV	4.40
Jasmine	White	BIO/AG/ENV	3.60
Greer	White	ENG	2.67
Kirsten	White	ENG	2.53
Jennifer	White	BIO/AG/ENV	3.40
Gwyneth	White	PHYS	3.00
Kanda	Native American	COMP/MAT	3.80
Jennifer	White	COMP/MAT	3.53
Temprance	White	ENG	2.07
Bethany	White	BIO/AG/ENV	2.80
Callan	Black	BIO/AG/ENV	3.33
Jordan	White	PHYS	2.27
Mathais	Native American	ENG	3.40
Kwesi	Black	COMP/MAT	3.53
Ruiz	Hispanic/Latino	COMP/MAT	5.00
Tom	Hispanic/Latino	COMP/MAT	2.87
Norman	White	COMP/MAT	2.73
Joshua	White	PHYS	3.87
Nelkowicz	White	ENG	3.67
Vern	White	COMP/MAT	4.07
Bill	White	PHYS	5.00
John	White	BIO/AG/ENV	3.13
JJ	White	ENG	3.27
Scott	White	ENG	3.67
Jim	White	PHYS	2.73
Nico	White	PHYS	4.13
Alexander	Hispanic/Latino	COMP/MAT	3.33
Kooks	Hispanic/Latino	ENG	3.53
Shinichi Li	Asian	PHYS	3.00
Robert	Hispanic/Latino	Self-definition	3.20
Kevin	Native American	ENG	3.60
Gertrude	Native American	COMP/MAT	4.33

Notes:
 1. The study sample includes 11 women (above dash line) and 21 men (below).
 2. ENG: Engineering & engineering technology; BIO/AG/ENV: Biological/agricultural/environmental sciences; PHYS: Physical sciences; COMP/MAT = Computer science/math
 3. Active learning scale score is a mean scale of 15 observed survey items that measure the extent to which students are engaged in active learning activities in their STEM classes during the first term of college. Items are based on a 5-point Likert scale, with 5 indicating "very often" and 1 indicating "never."

For Further Information

For more information, contact Principal Investigator Dr. Xueli Wang at xwang273@wisc.edu, or visit our website at: stemtransfer.wceruw.org

Funding Sources

This research project is supported by the National Science Foundation, grant No. DUE-1430642. The pilot phase of the study was partially funded by the UW-Madison Graduate School Alumni Research Foundation.



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Funded by the National Science Foundation, Award No. DUE-1430642