Does Engagement Matter to Degree Completion? The Impact of Engagement on Community College Transfer Students’ Success in STEM Fields of Study

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8/5/2016
OVERVIEW

► Rationale
► Purpose of the Study & Research Question
► Literature Review
► Theoretical Framework
► Data Analysis
► Findings
► Implications & Conclusion
Rationale: The Importance of STEM Education

- STEM skills are pivotal to the U.S. way of life, national economic and security matters (National Science Foundation, 2010)

- Demand for STEM profession is expected to exceed the workforce needs in all other occupation between 2012 and 2022 (Vilorio, 2014)

- Many more STEM careers now require 4-year degree (Carnevale, Smith, & Strohl, 2010).

- The U.S. is falling behind other nations in the proportion of STEM degrees attained (Kuenzi, 2008).
Rationale: STEM Degree Completion

Committee on Science, Engineering, and Public Policy, 2010
Rationale: The Role of Community College

- The U.S. must retain students entering college every year and guide them to major in STEM field to regain leadership role in STEM education.

- A strategy to increase STEM graduates: focus on community college transfer students (Hagedorn & Purnamasari, 2012).
  - About half of all college students in the United States who pursue STEM fields begin their studies at a community college (Starobin & Laanan, 2010)

- Problem: little data and empirical findings have been offered regarding STEM degree attainment among CC transfer students.
Purpose & Research Question

Purpose: To examine what college engagement factors predict baccalaureate degree attainment in STEM among community college transfer students.

RQ: For community college transfer students, how is their academic and social engagement in college, along with demographic and academic background, related to the probability of their baccalaureate degree attainment in STEM fields of study?
Literature on Engagement

Among community college students, student academic and social engagement was shown to positively correlate with retention and persistence to graduation (Bahr, 2008; Karp et al., 2010; Lundberg, 2014; Pascarella et al., 1986; Songer, 2011).

Transfer students’ engagement

- Seeking academic and student services (Ellis, 2013)
- Faculty (D’Amico et al., 2014);
- Class participation (Faura & Fuller, 2015; Townsend & Wilson, 2016)

Transfer students were found to be not as engaged as native students at the 4-year institution (Ishitani & Mckitrick, 2010).

Engagement of transfer students in STEM

- STEM courses (Myers et al.; 2015; Wang, 2015)
- Faculty and advisors (Jackson & Laanan, 2015; Kruse, 2015)
- Research opportunities (Hirst et al., 2014; Straw & Livelybrooks, 2012) \(\rightarrow\) STEM aspiration;
- Adjustment at the 4-year institution (Carlos & Lopez, 2016)
Theoretical Framework: I-E-O Model (Astin, 1993)

**Input (I)**
*Background Characteristics*
- Sex
- Race
- SES

**Environment (E)**
*Engagement-College Experiences*

**Academic:**
- Enrollment intensity
- Internship/co-op/field experience
- Research project
- Culminating senior experience
- Mentoring
- Talk with faculty about academic matters
- Meet with advisor about academic plans
- Work on coursework at library

**Social:**
- Study abroad
- Community-based project
- Participate in sports
- Volunteer services

**Output (O)**
*Educational Achievements*
- Obtained at least a Bachelor’s Degree in STEM
Data Analysis

- 1761 community college transfer students
- Descriptive analysis
- Logistic regression
Findings: Background Characteristics

**Gender**
- Female: 44%
- Male: 56%

**Race/Ethnicity**
- Asian: 13%
- Black: 12%
- Hispanic: 14%
- Multi-racial: 5%
- White: 56%
Findings: Background Characteristics

![Bar chart showing SES quartiles with percentages: 18.4%, 24.4%, 28.4%, 28.8%]
Findings: What engagement factors matter?

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Findings: Background

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<th>p</th>
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<th>Inverse Odd Ratios</th>
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## Findings: Academic Engagement

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### Findings: Social Engagement

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Implications & Conclusion

- There needs to be policies and practices aiming to help minority, especially Black, and low SES students to attain better educational outcomes (critical for Texas!)
- Higher education institutions need to seek to understand what hinder students’ full-time enrollment and make effort to foster enrollment intensity.
- Students should be encouraged to participate in research projects, especially in senior years, and community-based projects.
- More research needed to understand the experience of transfer minority students in STEM programs.
- Future research should investigate the experiences of non-traditional age transfer STEM students that lead to degree attainment. The use of ELS:2002 only helps explain the experience of traditional-aged college students.


Thank You!

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