Course Repetition in College-level Mathematics Courses among Community College Transfer Students

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Introduction

• GOAL
  • To examine the course repetition patterns in college-level math courses among community college transfer students

• WHY and HOW this study matters
  • Taking additional credits is not good for students, institutions and the state.
    • Avoiding (or reducing) excess credits
  • Inform implementing state-level guided pathways
  • Developing institutional practices
    • Advising
    • Institutional research
Types of Course Repetition

- Horizontal repetition (redundancy)
  - Taking additional gateway college-level math course even after already completing and passing another
  - For example, a student takes college algebra after completing and passing quantitative reasoning

- Vertical Repetition
  - Taking the same or lower level course after completing and passing
  - For example, a student takes college algebra after completing and passing trigonometry
Research Questions

• How common is math course repetition among community college transfer students?
  • Horizontal and Vertical Repetition
• Where does the course repetition occur?
• Who experienced course repetition?
  • By students’ backgrounds and students’ college experiences
• Do college outcomes of students vary by students’ course repetition status?
  • Cumulative GPA
  • Bachelor’s degree attainment within six-years
  • Time to a degree among those who earned a bachelor’s degree
  • Cumulative excess credits
Methodology

• DATA
  • The Texas Common Core Numbering System for math courses
  • ERC (Education Research Center)
  • Student-level transcript (course-taking) data from THECB

• SAMPLE
  • First-time community college starters (n=40, 885) in 2011-2012 and 2012-2013 in Texas
  • Those who transferred to a university within six-years of matriculation
  • Those who successfully *completed and passed* their first college-level math course at CC

• METHOD
  • Descriptive analysis
How common is horizontal repetition?

Horizontal Repetition

Ever: 36%
Community College: 26%
University: 12%

College Algebra Starters (38%)
Elementary Statistics (23%)
Math for Business (17%)
Quantitative Reasoning (3%)
How common is vertical repetition?

- 14.2% of transfer students retook the same level or a lower-level course within the specific sequence.
- Vertical repetition also occurred more frequently at the community college level.
- Business calculus (49.49%), math for teachers-II (26.23%), trigonometry (23.48%), pre-calculus (20.31%), calculus-III (20.12%) were the most frequently repeated courses.
- Students who retook the same-level or lower-level course in a specific sequence accumulated 3.35 course credit hours (equivalent to one additional 3-credit hour courses)
Who experienced horizontal course repetition?

- Asian -> the highest rate
- International students -> the lowest rate
Who experienced vertical course repetition?

- Black -> the highest rate
- Asian -> the lowest rate
Who experienced horizontal course repetition?

- Difference between Core completers and non-core completers
- Difference between enrollment status
Who experienced vertical course repetition?

Vertical Repetition by Students' College Experiences

```
<table>
<thead>
<tr>
<th>College Experience</th>
<th>Pell Recipients</th>
<th>Non-Pell Recipients</th>
<th>FAFSA Filers</th>
<th>Non-FAFSA Filers</th>
<th>Major Switchers</th>
<th>Non-majors Switchers</th>
<th>Core Completers</th>
<th>Non-core Completers</th>
<th>Associate Degree Holders</th>
<th>No Associate Degree Holders</th>
<th>Part-time</th>
<th>Full-time</th>
<th>Partial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>15%</td>
<td>14%</td>
<td>15%</td>
<td>13%</td>
<td>15%</td>
<td>14%</td>
<td>16%</td>
<td>12%</td>
<td>13%</td>
<td>15%</td>
<td>14%</td>
<td>10%</td>
<td>15%</td>
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</tbody>
</table>
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Texas Success Center
Bachelor’s Degree Attainment Within Six-years

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<thead>
<tr>
<th>Ever-Horizontal Repeaters</th>
<th>Never-horizontal Repeaters</th>
<th>Ever-vertical Repeaters</th>
<th>Never-vertical Repeaters</th>
</tr>
</thead>
<tbody>
<tr>
<td>37.3%</td>
<td>36.5%</td>
<td>26.5%</td>
<td>40.6%</td>
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</table>

Cumulative GPA

<table>
<thead>
<tr>
<th>Ever-Horizontal Repeaters</th>
<th>Never-horizontal Repeaters</th>
<th>Ever-vertical Repeaters</th>
<th>Never-vertical Repeaters</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>3.0</td>
<td>2.4</td>
<td>3.1</td>
</tr>
</tbody>
</table>
Time to a Bachelor's Degree among those who Earned a Bachelor's Degree

- Ever-Horizontal Repeaters: 15.7
- Never-horizontal Repeaters: 16.0
- Ever-vertical Repeaters: 16.4
- Never-vertical Repeaters: 15.9

Excess Cumulative Credits among those Earned a BA

- Ever-Horizontal Repeaters: 19
- Never-horizontal Repeaters: 14
- Ever-vertical Repeaters: 21
- Never-vertical Repeaters: 14
Discussion and Implications

- Importance of aligning students’ first college-level math course with meta majors
- Developing advising strategies
- Develop data analytics tools to identify course repetitions
  - Early warning system
  - Identify why certain courses are overrepresented (e.g., calculus for business)
- Use disaggregated data to examine course-taking patterns (e.g., race)
Next Steps

- Predict college outcomes (bachelor’s degree attainment, time to a bachelor’s degree, excess credits) by students’ course repetition status
  - Logistic and OLS Regression