Analysis of Placement Into Developmental Mathematics

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Why proper placement is necessary

- Goal: SUCCESS in college level class or terminal math class

- According to NCES 60% of community college students are referred to at least one developmental math course.
  - Also true for University of Alaska, Fairbanks, an open enrollment, four year institution

- Self-placement not accurate. Students over-estimate their ability to avoid developmental classes.

- DEVM high failure rates
Why proper placement is necessary

- Mandatory assessment AND mandatory placement at U.S. public colleges:
  - 35% in 1992
  - 79% in 2007

- Coincides with rise in enrollment in two-year colleges

- University of Alaska, Fairbanks mandatory assessment and placement 2009
Why proper placement is necessary

- Leaky pipeline issue
  - Longer path to graduation
  - Students less likely to complete degree

- Goal: Get students through developmental coursework as quickly as possible
  - Reduce number of attempts
  - Placement with success as the goal
  - Not too easy, not too hard
Why proper placement is necessary

- Placement scores are not enough
  - Belfield and Crosta: “Predicting Success in College: The Importance of Placement Tests and High School Transcripts”. Placement tests are not good predictors of grades in DEVM.
  - The validity of placement tests is context and test-specific
  - Additional information should be used: high school transcript and high school GPA

- Practical considerations with high school transcripts and GPA
  - Incomplete or missing transcripts
  - Outdated transcripts
  - Slows the placement and registration process
  - Rural issue
Prior placement methods

- DEVM and MATH Placement Committee formed 2012-2014

- Pass rates and placement methods studied

- Placement methods varied:
  - Accuplacer, Compass, ACT, SAT, prior coursework, no placement

- Despite mandatory placement NO METHOD OF PLACEMENT

  - Pre Algebra 18%, Beginning Algebra 16%, Intermediate Algebra 16% (11.13.15 IR Report)

  - Instructor and advisor training needs to be improved

  - Rural and web sections
Prior placement methods

- First Attempt Pass Rates Fall 2010- Spring 2014
- Prerequisites limited to two years prior
- Data from Institutional Research Report 11.13.15

<table>
<thead>
<tr>
<th>Placement method</th>
<th>Pre-Algebra</th>
<th>Beginning Algebra</th>
<th>Intermediate Algebra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>0.66</td>
<td>0.54</td>
<td>0.64</td>
</tr>
<tr>
<td>Coursework</td>
<td>n/a</td>
<td>0.52</td>
<td>0.60</td>
</tr>
<tr>
<td>Test*</td>
<td>0.68</td>
<td>0.54</td>
<td>0.67</td>
</tr>
<tr>
<td>None</td>
<td>0.57</td>
<td>0.57</td>
<td>0.62</td>
</tr>
</tbody>
</table>

- * ACT/ SAT/ Accuplacer/ Compass/ Asset
- Non-overlapping groups
Prior placement methods

- Problems with current methods
  - Compass/ Accuplacer/ SAT/ ACT: One bite apple
    - Our students often don’t take it seriously
  - Compass/ Accuplacer proctoring slows or delays registration
    - Often more than one year passes
  - SAT/ ACT dated information
    - UAF 30% non-traditional students
  - Pass rates better when scores were less than two years old and considered only first attempts
Researched placement methods

- Divided the country into four geographic regions

- Each committee member researched institutions and their placement methods
  - Touchy feely
  - Institutional algorithm
  - SAT / ACT / AP (most common)
  - High school GPA / Transcript
  - ALEKS Placement, Preparation and Learning (Aleks PPL)
  - Almost all high stakes
Researched placement methods

- Decided to explore ALEKS PPL
  - Multiple attempts placement with self remediation between attempts
  - Each committee member found one institution using ALEKS PPL and conducted an interview. Northwestern University, University of Memphis, Portland State University
  - Schools happy with product, not with the price
  - Some were going to continue, some considering not to continue
 Researched placement methods

- ALEKS PPL Findings
  - All schools allowed first attempt to be unproctored
  - Other attempts sometimes proctored
  - Significant cost (varied by schools)
  - Sometimes cost passed to students, sometimes schools paid, some split the cost
  - No formal analysis of the effectiveness, generally favorable
  - Cheating up to 20% estimated by discrepancy between Aleks PPL and ACT/SAT
  - Cheating rate was acceptable
  - Emporium style or self remediation required before students could enroll in credit bearing math

- We decided to implement change to Aleks PPL at UAF
Difficulties and challenges

- Money, money, money
  - Previous methods paid for by the institution
  - Potential students take placement tests, don’t register, cost not recovered (121 out of 1373 did not enroll). Tolerable.

- Six week learning module

- Not proctored

- Stakeholder Communication
Difficulties and challenges

- **Staff**
  - Score transferring
  - Billing students
  - Advising
  - Recruiting

- **Faculty**
  - Two departments MATH and DEV
  - Setting/Modifying cut scores
  - Analyzing effectiveness
  - Setting up cohorts
  - Monitoring cheating
  - We’ve always done it this way
  - Sabbaticals, turnover in faculty
Difficulties and challenges

- Rural Campuses
  - High school counselors

- High School students
  - Rural
  - AP scores
  - Taking it serious or not
  - Starting 6 week learning module, but not completing it
  - High school counselors
Difficulties and challenges

- Administration
  - Signing a contract
  - How to handle the billing from company and billing students

- Statewide System of Higher Education
  - Three major academic units (MAU) covering entire state
  - Policy makers dictate consistency between the three MAUs
  - Should DEVM not MATH use?
Results of new placement system

- **Counts and Percents of Attempts on Placement Exam**

  - N=1522 took new placement test leading up to Fall 2014 semester.
  - Data from Aleks Report: All attempts, Fall14 cohort, 1/31/14-10/1/14
  - Includes all placement, DEVM and MATH.
  - n=383 took more than once

<table>
<thead>
<tr>
<th>Attempts:</th>
<th>one</th>
<th>two</th>
<th>three</th>
<th>four</th>
<th>five</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=1522</td>
<td>1139</td>
<td>296</td>
<td>71</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>percent</td>
<td>75%</td>
<td>19%</td>
<td>5%</td>
<td>0.6%</td>
<td>0.5%</td>
</tr>
</tbody>
</table>
Results of new placement system

- Counts and Percents of Improved Placement

- Data from Aleks Report: All attempts, Fall14 cohort, 1/31/14-10/1/14
- Includes all placement, DEVM and MATH.
- n=117 (8%) students initially placed into DEVM then improved placement to MATH

<table>
<thead>
<tr>
<th>Improved placement:</th>
<th>0 class</th>
<th>1 class</th>
<th>2 class</th>
<th>3-4 classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=383</td>
<td>80</td>
<td>249</td>
<td>49</td>
<td>5</td>
</tr>
<tr>
<td>percent</td>
<td>21%</td>
<td>65%</td>
<td>13%</td>
<td>1%</td>
</tr>
</tbody>
</table>
Results of new placement system

- Percent of enrolled students who placed into each level

- Data from IR 11.15.15
- Decreased placement into pre-algebra
- Increased placement into intermediate algebra and MATH placement
  - Highest placement per calendar year per student. Not distinct head count across years.

<table>
<thead>
<tr>
<th>Placement into:</th>
<th>Pre-algebra or lower</th>
<th>Beg. Algebra</th>
<th>Int. Algebra</th>
<th>MATH</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2010-F2015 Not Aleks</td>
<td>36%</td>
<td>19%</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>F2014-S2015 Aleks</td>
<td>13%</td>
<td>18%</td>
<td>34%</td>
<td>35%</td>
</tr>
</tbody>
</table>
Results of new placement system

- **First attempt pass rates** (IR 11.13.15)

<table>
<thead>
<tr>
<th>Pass Rate</th>
<th>Prealgebra</th>
<th>Beg. Algebra</th>
<th>Int. Algebra</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2010 - S2014 Not Aleks</td>
<td>66%</td>
<td>54%</td>
<td>64%</td>
</tr>
<tr>
<td>F2014 - S2015 Aleks</td>
<td>54%</td>
<td>51%</td>
<td>66%</td>
</tr>
</tbody>
</table>

- Pre-algebra pass rate goes down. Possible reason: more students going straight to Beginning Algebra, weakest students left behind
- N=892 Placed into DEVM (Aleks Best Placement Report)
- n=389 (44%) Took DEVM class Fall 2014
Results of new placement system

- “No placement” rate improved

- IR Report 11.13.15

<table>
<thead>
<tr>
<th>No placement</th>
<th>Prealgebra</th>
<th>Beg. Algebra</th>
<th>Int. Algebra</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2010-S2014 Not Aleks</td>
<td>18%</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>F2014-Sum2015 Aleks</td>
<td>2%</td>
<td>4%</td>
<td>9%</td>
</tr>
</tbody>
</table>

- No placement is defined as no placement data in Banner or data that is more than two years old from the time the class was taken.
Summary

PROS:
- Similar pass rates
- Less students placing into developmental math. Addresses leaky pipeline
- Consistent placement methods for all students
- Reduce the rate of “no-placement”
- Low stakes
- Chance to self-remediate
- Most current snapshot of student ability

CONS:
- $25 fee
- Getting faculty to deal with potential cheaters
- Statewide consistency
- Change is hard

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