Covering All the Angles of Student Success:
Using Many Sources to Inform Admissions and Enrollment Practices

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Roadmap

• The power of multiple measures
  – Traditional Measures
    • HSGPA
    • Test scores
  – Nontraditional Measures
    • High School Academic Rigor Index
    • Academic Behaviors
    • Interest-Major Fit

• Prototypes of User Tools: Personalized feedback and insights
  – Personalized college readiness zone
  – Academic- and interest-major fit map
The Power of Multiple Measures
Traditional Measures

HSGPA + Test Scores
By considering both a student HSGPA and their test scores, a more accurate picture of students’ likelihood of future success emerges.

This is true in terms of first year success:

Test scores add useful information above and beyond HSGPA in the prediction of first-year GPA (FYGPA).

For example, among students with a 3.0 HSGPA, students with an ACT composite score of 20 has a .37 probability of earning a B or higher as compared to .66 probability for students with an ACT composite score of 30.
HSGPA + Test Scores

This is also true in terms of more long term indicators of success such as cumulative GPA over six years of college and college completion.

For example, among students with a 3.0 HSGPA, students with an ACT composite score of 20 has a .41 probability of earning a cumulative GPA of 3.00 or higher as compared to a .68 probability for students with an ACT composite score of 30.
Validity for Student Subgroups

The results presented thus far are based on the total group. Some may wonder if these measures, in particular test scores, are valid for specific subgroups of students.

Differential prediction analyses test whether the relationship between test scores and an educational outcome is the same across subgroups of interest.

As shown in the figure, among students with the same ACT Composite score, African American and Hispanic students are less likely to earn a FYGPA of 2.5 or higher (and 3.0 or higher) than White students (Sanchez, 2013).
Nontraditional Measures

- High school academic rigor
- Academic behaviors
- Interest-major fit
Why consider additional measures?

• Traditional measures
  - HSGPA = Average high school course grades from core subject areas
  - Test scores
    • Overall predictive strength for first-year GPA: 0.520
    • 0.615 after correcting for selection effects
    • 1.000 is perfect prediction

• Might help measure college readiness / predict college success
• Improve diagnosis of student needs
High School Academic Rigor
Why measure academic rigor?

• HSGPA may not mean the same thing for all students
  – Different mixes of high school courses
  – Variation in grading practices
  – Advanced coursework

• Encourage students to pursue rigor

• Prior studies suggest effects of rigor on degree attainment

• Need to operationalize rigor
What makes high school coursework rigorous?

- Choice of elective courses
- Intensity or difficulty
- Quality of instruction
- Student engagement (Grades)
- Designation (Advanced Placement, Honors, etc.)
- Alignment to college courses
How we measured rigor

Example: English courses

- Grade 8 test scores
- English 9
- English 10
- English 11
  - A: +0.213
  - B: +0.095
  - C: -0.021
  - D: -0.124
  - F: -0.237
  - Not taken: 0
- English 12
- Other English
- First-year college GPA

Advanced English Coursework
+0.047
Which high school courses are most predictive of first-year grades?

<table>
<thead>
<tr>
<th>Course</th>
<th>Participation rate</th>
<th>Increase in college GPA A vs. C</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 11</td>
<td>~100%</td>
<td>+0.234</td>
</tr>
<tr>
<td>English 10</td>
<td>~100%</td>
<td>+0.159</td>
</tr>
<tr>
<td>Chemistry</td>
<td>92%</td>
<td>+0.125</td>
</tr>
<tr>
<td>Algebra 2</td>
<td>98%</td>
<td>+0.119</td>
</tr>
<tr>
<td>Other math beyond Alg. 2</td>
<td>65%</td>
<td>+0.088</td>
</tr>
<tr>
<td>Trigonometry</td>
<td>59%</td>
<td>+0.084</td>
</tr>
</tbody>
</table>
How well does the High School Academic Rigor index predict first-year GPA?

<table>
<thead>
<tr>
<th></th>
<th>Correlations</th>
<th>Multiple measure weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSGPA</td>
<td>0.478</td>
<td>0.109</td>
</tr>
<tr>
<td>ACT Composite</td>
<td>0.400</td>
<td>0.192</td>
</tr>
<tr>
<td>HSAR index</td>
<td>0.495</td>
<td>0.297</td>
</tr>
<tr>
<td>Total</td>
<td>0.521</td>
<td></td>
</tr>
</tbody>
</table>
Limitations of High School Academic Rigor index

– Does not capture all aspects of rigor
  • Differences in grading standards
  • Differences in intensity/quality
  • Course standards and alignment to college courses

– Reliance on student self-reported data

– First-year GPA mixes courses, can hide differences
Academic Behaviors
Why measure academic behaviors?

• Students’ personal characteristics and behavior development influence their ability to stay in school and be successful.

• Research suggests early identification of at-risk students is one of the most effective ways to prevent poor performance and reduce chances of dropping out (Beck and Davidson, 2001).
ACT Engage – Behavioral Assessment

- **Motivation** personal characteristics that help students succeed academically by focusing and maintaining energies on goal-directed activities.

- **Social Engagement** interpersonal factors that influence students’ successful integration into their environment.

- **Self-Regulation** cognitive and affective processes used to monitor, regulate, and control behavior related to learning.
Test Scores + Academic Behaviors

Average FYGPA by Test Scores and ACT Engage Academic Discipline

Four-Year Institutions

Two-Year Institutions
Test Scores + Academic Behaviors

Retention and Timely Graduation at 4-Year Institutions, by ACT Composite and ACT Engage Scores

First-Year Retention

Timely Graduation

Percentage Attaining a Timely Postsecondary Degree, by ACT and ENGAGE College Scores

ACT Composite Score

Bottom 25%  Middle 50%  Top 25%

Low ENGAGE Moderate ENGAGE High ENGAGE

First-Year College Retention at 4-Year Institutions, by ACT and ENGAGE College Scores

ACT Composite Score

Bottom 25%  Middle 50%  Top 25%
Applications of Engage Research

- Use of ACT Engage to Identify Students Academically at Risk

<table>
<thead>
<tr>
<th>Selection Method</th>
<th>Drop Out</th>
<th>Academic Difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>ACT Engage Success Indices</td>
<td>24%</td>
<td>46%</td>
</tr>
</tbody>
</table>

**Accuracy of Identification**

*Academic Success Index* indicates the likelihood of obtaining a GPA of 2.0 or higher after the first semester at a postsecondary institution.

*Retention Index* indicates the likelihood of persisting through the second year of college.
Interest-Major Fit
Why measure interest-major fit?

• Many students are unsure about their college major
  13% choose “Undecided” for planned college major
  20% not sure about their planned college major
  51% need help deciding plans
  **61% are undecided, not sure, or need help**

• Support major/career guidance and exploration
Why measure interest-major fit?

- Predictive of persistence in major

![Persistence in Major by ACT Score Range and Interest-College Major Fit](chart.png)
How we measured interest-major fit

- Holland-type profiles of majors and students

<table>
<thead>
<tr>
<th>Holland type</th>
<th>ACT Interest Inventory Scale</th>
<th>Example item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>Technical</td>
<td>Build furniture</td>
</tr>
<tr>
<td>Investigative</td>
<td>Science &amp; Technology</td>
<td>Use a microscope or other lab equipment</td>
</tr>
<tr>
<td>Artistic</td>
<td>Arts</td>
<td>Write a movie script</td>
</tr>
<tr>
<td>Social</td>
<td>Social Service</td>
<td>Teach people a new hobby</td>
</tr>
<tr>
<td>Enterprising</td>
<td>Administration and sales</td>
<td>Hire a person for a job</td>
</tr>
<tr>
<td>Conventional</td>
<td>Business Operations</td>
<td>Keep expense account records</td>
</tr>
</tbody>
</table>
How we measure interest-major fit: Major profiles

![Graph showing major profiles for Cell Biology, Theatre Arts, and Accounting.](chart.png)
How we measure interest-major fit

- Student profiles can be compared to major profiles to measure fit.
- Here’s an example of a student with very strong fit with Cell Biology.
How we measure interest-major fit

- Here’s an example of a student with poor fit with Cell Biology
Distribution of interest-major fit

- Fit with other majors
- Fit with Planned Major

Average score
Example multiple measure model

Timely degree attainment prediction weights

- HSGPA: 0.373
- ACT Composite: 0.367
- Motivation: 0.274
- Interest-major fit: 0.165
- Family income: 0.103

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ACT®
Prototypes of Users Tools: Personalized Feedback & Insights

• Personalized College Readiness Zone
• Academic- and Interest-Major Fit
Personalized College Readiness Zone

- Major: Overall
- ACT Composite Score: 11 Min, 30%
- High School GPA: 0.00 Min, 3.61
- Interest-Major Fit: 0 Min, 42%
- Engage: Academic Discipline: 10 Min, 39%
- Engage: Social Activity: 10 Min, 40%

- Probability of Earning a B or Higher in College: 74.8%
- Probability of Returning for a Second Year: 82.9%
- Probability of Graduating in Four Years: 45.1%
Academic- and Interest-Major Fit
Questions for us?

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