Harnessing Analytics

To Improve Student Success
Is the Status Quo Acceptable?

Are we sure we understand the environment?

Do you specifically know what to change?

Can that change be supported with evidence?

Will the investment be worth the outcomes?

How will you know?

Analytics
Built by and for educators, PAR Framework is a provider of analytics-as-a-service, delivering actionable institutional-specific insight to more than 350 campuses.

Anonymized STUDENT level data
Openly published frameworks
2.3 million students
24+ million student courses
350+ unique campuses
One comprehensive dataset
“The beginning of wisdom is a definition of terms”

– attributed to Socrates
Analytics

Discovery and communication of meaningful patterns in data
<table>
<thead>
<tr>
<th>Count</th>
<th>Object</th>
<th>Material</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Tree</td>
<td>Palm</td>
<td>Natural</td>
</tr>
<tr>
<td>8</td>
<td>Picnic Tables</td>
<td>Wood</td>
<td>Man Made</td>
</tr>
<tr>
<td>5</td>
<td>Grills</td>
<td>Metal</td>
<td>Man Made</td>
</tr>
<tr>
<td>7</td>
<td>Trash Cans</td>
<td>Cement</td>
<td>Man Made</td>
</tr>
</tbody>
</table>
Descriptive Analytics

This data indicates a sandy beach on a large body of water, located in a warm climate with adequate picnic facilities for 8 groups.

Given the low angle of the sun it is likely the data was collected in the late evening or early morning.
Predictive Analytics

80% Chance sunset occurred within an hour of this data collection point

85% Chance that none of the grills are in use

90% Chance of sunburn if the data collector is Russ
When you visit this location, wear casual attire appropriate for the beach in a warm climate, and bring your own picnic supplies and food if you plan to eat.

Russ, given your complexion, apply sunscreen liberally.
## Findings From Aggregated Dataset

<table>
<thead>
<tr>
<th>Positive Predictors</th>
<th>Negative Predictors</th>
<th>Varies but can be significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school GPA (when available)</td>
<td>Withdrawals</td>
<td>PELL Grant Recipient</td>
</tr>
<tr>
<td>Duel Enrollment – HS/College</td>
<td>Low # of credits attempted</td>
<td>Taken Dev Ed</td>
</tr>
<tr>
<td>Any prior credit</td>
<td></td>
<td>Age</td>
</tr>
<tr>
<td>CC GPA</td>
<td></td>
<td>Fully online student</td>
</tr>
<tr>
<td>Credit Ratio</td>
<td></td>
<td>Race</td>
</tr>
<tr>
<td>Successful Course Completion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive completion of DevEd Courses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Common Data Definitions

Retention
Student Success
Completion
Term
Passing Grade
“Computers are useless, they can only give you answers”

– Picasso
Analytics in Higher Education

Learning Analytics

Best way to teach and learn

Learner Analytics

Best way to support students

Organizational Analytics

Best way to operate a college
Analytics in Higher Education

INSTITUTIONAL GOALS

- Data Store(s)
- Common Data Definitions
- Understand (Reporting & Analytics)
- Identify (Predictive Analytics)
- Act (Interventions & Policy)
- Measure (Record Interventions & Actions)
- Analyze (Impacts of Intervention & Action)

INSTITUTIONAL GOALS
Descriptive and Predictive Insight

**Descriptive Analytics**

**Institutional** Student/degree/major level insight into:

1. What *did* the retention look like for students entering in the same cohort?
2. How does your institution compare to peer institutions / institutions in other sectors?
3. How *did* performance vary by student attributes?

**Predictive Analytics**

**Specific** insight into:

1. What students are being retained over time?
2. Which students are currently at risk for completing and why?
3. Which factors are directly correlated to student success?
4. What is the predicted course completion rate for a particular program?
Descriptive Analytics

Understand
(Reporting & Analytics)
Predictive Analytics

What's the goal?
What Are We Predicting?
Predicting Risk

How do we know if a student is at risk of failing an important course?

Which courses are predicted to be the 'toughest'?

What's the probability that a student will return the following semester?

What factors contribute to risk and how do we find them?
Credit Scores: An Example of Data Mining
Credit Scores: An Example of Data Mining

- Poor: 300-619
- Fair: 620-679
- Good: 680-730
- Great: 730+

Components of a Credit Score:
- Paying Your Bills on Time: 35%
- How Much Money You Owe: 30%
- Other Factors - Types of Debt: 10%
- New Requests for Credit: 10%
- Length of Credit History: 13%
Credit Scores: An Example of Data Mining

Bad Credit
- Late or Missed Payments
- Too Many Credit Requests
- Foreclosures

Good Credit
+ Pay Bills on Time
+ Low Credit Card Balances
+ Age of Accounts
PAR Score

PAR Scores (Predictive Analytics)
PAR Score

% chance that a student is retained and progresses

- Retention is term to term
- Progression is '15 to Finish'
PAR Score

Low PAR Score *(Example Reasons)*

- Lots of withdrawals
- Low GPA
- Slow progress
PAR Score

High PAR Score *(Example Reasons)*

- Place out of Dev Ed
- High GPA
- '15 to Finish' rate of progress
Student Watch List

- Multiple measures of student success
  - PAR Score
  - GPA
  - Credit Ratio
  - Probability of Retention
  - Velocity Score (15 to Finish)
  - Risk Factors
## Student Watch List

### Individual Student Level

<table>
<thead>
<tr>
<th>PAR Score</th>
<th>GPA</th>
<th>Credit Ratio</th>
<th>Retention Score</th>
<th>Velocity Score</th>
<th>Earned Cr.</th>
<th>Total Cr.</th>
<th>PAR_ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>31%</td>
<td>1.75</td>
<td>67%</td>
<td>78%</td>
<td>40%</td>
<td>24</td>
<td>24</td>
<td>0009A0E3...</td>
</tr>
<tr>
<td>18%</td>
<td>2.60</td>
<td>69%</td>
<td>69%</td>
<td>25%</td>
<td>46</td>
<td>46</td>
<td>0009D606...</td>
</tr>
<tr>
<td>81%</td>
<td>3.11</td>
<td>97%</td>
<td>91%</td>
<td>89%</td>
<td>107</td>
<td>107</td>
<td>000E3666...</td>
</tr>
<tr>
<td>69%</td>
<td>2.76</td>
<td>94%</td>
<td>90%</td>
<td>77%</td>
<td>46</td>
<td>55</td>
<td>000FD570...</td>
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<tr>
<td>95%</td>
<td>3.45</td>
<td>100%</td>
<td>95%</td>
<td>100%</td>
<td>68</td>
<td>68</td>
<td>0011060E...</td>
</tr>
<tr>
<td>74%</td>
<td>2.60</td>
<td>80%</td>
<td>92%</td>
<td>80%</td>
<td>12</td>
<td>12</td>
<td>001889D1...</td>
</tr>
<tr>
<td>11%</td>
<td>1.88</td>
<td>60%</td>
<td>54%</td>
<td>21%</td>
<td>31</td>
<td>31</td>
<td>001B9887...</td>
</tr>
<tr>
<td>25%</td>
<td>1.65</td>
<td>52%</td>
<td>79%</td>
<td>31%</td>
<td>14</td>
<td>14</td>
<td>001C90E2...</td>
</tr>
<tr>
<td>34%</td>
<td>4.00</td>
<td>83%</td>
<td>81%</td>
<td>42%</td>
<td>19</td>
<td>19</td>
<td>001D0B4...</td>
</tr>
<tr>
<td>67%</td>
<td>2.83</td>
<td>81%</td>
<td>80%</td>
<td>84%</td>
<td>126</td>
<td>126</td>
<td>00211963...</td>
</tr>
</tbody>
</table>
## Scoring Student Factors

<table>
<thead>
<tr>
<th>SSMx Predictor</th>
<th>PAR Score</th>
<th>N Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>DevEd attempted 0% pass*</td>
<td>18%</td>
<td>1,348</td>
</tr>
<tr>
<td>Low ongoing GPA (&lt;2)*</td>
<td>19%</td>
<td>5,456</td>
</tr>
<tr>
<td>Fully Online Student (Online Ratio=1)*</td>
<td>26%</td>
<td>237</td>
</tr>
<tr>
<td>Low credit ratio*</td>
<td>28%</td>
<td>10,376</td>
</tr>
<tr>
<td>DevEd, &gt; 50% of courses taken*</td>
<td>30%</td>
<td>1,359</td>
</tr>
<tr>
<td>DevEd attempted &lt;100% pass*</td>
<td>32%</td>
<td>3,498</td>
</tr>
</tbody>
</table>
Connect to Interventions

- Connect Student Success (SSMx) Predictors to Interventions (*Examples*):
  - Advising
  - Tutoring
  - Early Alerts
Improvement via Interventions
## Parker Parsons

### Overview
- **PAR Risk Score**: 0.77
- **Past due Balance Hold**

### Appointment Overview
- 7/6/15 – Academic Advisor
- Discussed academic standing
- Discussed career goals
- Referred to Math Tutoring

### Info
- **Incoming GPA**: 2.5
- **Incoming ACT**: 22
- **Credits Attempted**: 15
- **Credits Passed**: 6
- **Term GPA**: 2.3
- **Cum GPA**: 2.7
- **Major**: Aviation

### Act
- Utilize Risk Scores

### Intervention Plan
- Act (Interventions & Policy)

### Action Item
- **PAR Score**: 23
- Poor

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**Note**: The image contains a flowchart with a red circle indicating an action item, and a blue circle for the intervention plan.
“Measure what is measurable, and make measurable what is not so.”

– Galileo
Leeward Community College – Designated FTIC - First Year 2 Digit CIP: Business Management Marketing
Leeward Community College – Designated FTIC - First Year 2 Digit CIP: Mechanic & Repair Tech
University of Hawaii at Manoa – Designated FTIC - First Year
Overall Course Pass Average: 83%
PSY100 Course Pass Average: 68%

<table>
<thead>
<tr>
<th>Program (2-Digit CIP)</th>
<th># Records</th>
<th>Pass Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIBERAL ARTS &amp; SCIENCES</td>
<td>1,758</td>
<td>0.66</td>
</tr>
<tr>
<td>BIOLOGICAL &amp; BIOMEDICAL SCI</td>
<td>261</td>
<td>0.72</td>
</tr>
<tr>
<td>ENGINEERING</td>
<td>94</td>
<td>0.67</td>
</tr>
<tr>
<td>SOCIAL SCIENCES</td>
<td>61</td>
<td>0.64</td>
</tr>
<tr>
<td>VISUAL AND PERFORMING ARTS</td>
<td>60</td>
<td>0.67</td>
</tr>
<tr>
<td>FOREIGN LANG, LIT &amp; LINGUIST</td>
<td>48</td>
<td>0.56</td>
</tr>
<tr>
<td>PHYSICAL SCIENCES</td>
<td>45</td>
<td>0.69</td>
</tr>
<tr>
<td>COMPUTER &amp; INFO SCIENCES</td>
<td>45</td>
<td>0.60</td>
</tr>
</tbody>
</table>
Hawaii Community College – First Year
2 Digit CIP: Business Management Marketing
## Community College Predictors of Success at 4-Year Schools

<table>
<thead>
<tr>
<th>Variable</th>
<th>UMUC GPA</th>
<th>Hawaii GPA</th>
<th>UMUC Retention</th>
<th>Hawaii Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race (non-Asian Minority)</td>
<td>Negative</td>
<td>Positive</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Age (Older)</td>
<td>Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (Female)</td>
<td>Positive</td>
<td>Positive</td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Married</td>
<td>Positive</td>
<td></td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Pell Recipient</td>
<td>Negative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DevEd Attempted</td>
<td></td>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>DevEd Math/Eng Completion</td>
<td>Positive</td>
<td></td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>Math Completed</td>
<td>Positive</td>
<td>Positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English Completed</td>
<td>Positive</td>
<td></td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Repeating a Course</td>
<td></td>
<td></td>
<td>Negative</td>
<td>Positive</td>
</tr>
<tr>
<td>Associate's Earned</td>
<td>Positive</td>
<td>Positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC GPA</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>Course Delivery Mode at U (Other)</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>First Term Full Time at U</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
<td>Negative</td>
</tr>
<tr>
<td>First Term Credits Attempted at U</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>First Term GPA at U</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>First Term Credit Ratio at U</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
<td>Positive*</td>
</tr>
</tbody>
</table>
Community College Predictors of Success at 4-Year Schools

DevEd math completion

Completing any math predictor of GPA

Completing AA/AS degree

GPA strong predictor of success

PAR paper on the study available online
Institutions Participated
community colleges, traditional 4 year colleges, and non-
traditional primarily online colleges are represented, courses were
not mandatory

of the Student Success Courses were associated with
statistically significant higher levels of retention to
the second year (after controlling for other variables) Odds
Ranges from 1.14 to 4.03
Student Success Course

2.1x More likely to be Retained to second year

Pathways to Completion (PTC – Student Success Plan)

Intrusive Case Management

4.1x More likely to be Retained to second year (Active Students)

My Academic Plan (MAP – Student Success Plan)

Prescriptive Academic Advising

3.4x More likely to be Retained to second year

On average they have higher GPA, Credit Ratio, Credit Attempted, Credit Completed, and Fewer Withdraws
“Knowing is not enough; we must apply. Willing is not enough; we must do.”

– Goethe
What concerns do you envision with using the PAR scores?
How would you address or mitigate these concerns?

How could you use the PAR scores in Advising to improve retention?

- Program / Course Level?
- Student Level?

Please list the top 3-5 items from each group on the provided flipchart.
Driving student success via Analytics, Interventions, Measurement, and Benchmarks