Don’t Put the Cart Before the Horse: A Decomposition Study to Identify Target Student Populations for High Impact Practices
Outcomes

1. Context: Changing campus
2. Changing the nature of inquiry
3. What we really mean by decomposition and what we did
4. Examples academic probation and CNRS
5. Next steps for HSU
UNSTOPPABLE FORCE VS THE IMMOVABLE OBJECT
Changing First-Time Undergraduates at Humboldt State University

### Increasing Size

- **2010**: 1310
- **2011**: 1310
- **2012**: 1310
- **2013**: 1310
- **2014**: 1386

In 2014, HSU enrolled its largest and most diverse class.

### Increasing Diversity

- **Non-URM/URM**:
  - **2000**: 83% / 17%
  - **2010**: 63% / 37%
  - **2014**: 49% / 51%

### Location, Location, Location

- **41% LA**
- **15% SF Bay**
- **6% Local**

# of Students from Southern California and surrounding areas continues to increase while...

...# of Students from the local area continues to decline.

### First In Family

- **2008**: 42%
- **2010**: 50%
- **2014**: 58%

In 2014, first-generation students make up over half of the new freshmen class.

### Student Achievement

In 2014, the average HSGPA of the incoming class was 3.15, a .05 point increase since 2012.

- **25th %**: 2.93
- **50th %**: 3.15
- **75th %**: 3.44

### Family Income

- **50%**: Non-URM/URM
- **59%**: URM/URM
- **100%**: Hispanic
- **83%**: Native American
- **17%**: Asian

Since 2010, HSU has seen a 23% percent increase in low-income students.

### Ready for College Level Work?

- **54% College Ready**
- **46% Pre-collegiate**

About 0.2% are international.

### Majors

- **CNRS**: 43%
- **AHSS**: 21%
- **CPS**: 23%
- **UNDC**: 13%

In 2014, around 2 out of 5 students pursued the Sciences.
Current Structure

- All or nothing approach
  - “blunt instrument”
  - Give it to everyone and hope someone benefits from it.
- Disconnect between students’ needs and intervention(s).

- Is it the right one?
- Is it the right time?
- Does more = better?
- What do we stop?
Defining Student Success

“Jumping the Shark”

The beginning
Student matriculates and is exposed to the academic and social systems of higher education...

Challenges

The end
Student overcomes challenges, earns academic credit and hopefully, learns something...
Appreciative Inquiry

“Every organization has something that works right—things that give life when its most alive, effective, successful, and connected in healthy ways to its stakeholders and communities. AI begins by identifying what is positive and connecting to it in ways that heighten energy and vision for change.”
The “right intervention, at the right time, for the right student.”
If 2: Black to e4 then 2 f4+ away to h8! g7? a+ b2 = c5 + b2 \[ \sum = 1 \]
**Pre Entry Characteristics**
- Family Background
- Skills & Abilities
- Prior Education

**Initial Goals/Commitments**
- Intention
- Educational Goal
- Institutional Commitment
- External Commitments

**Institutional Experiences**
- Academic Performance
- Faculty Interactions
- Extra Curricular Activities
- Social Interactions

**Integration**
- Academic
- Social

**Revised Goals/Commitments**
- Intention
- Educational Goal
- Institutional Commitment
- External Commitments

**Outcome**
- Leave HSU?
  - No
  - Yes
<table>
<thead>
<tr>
<th>Factors Associated with Student Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Commitment to the Institution</td>
</tr>
<tr>
<td>2 Communication Skills</td>
</tr>
<tr>
<td>3 Analytical Skills</td>
</tr>
<tr>
<td>4 Self-Discipline</td>
</tr>
<tr>
<td>5 Time Management</td>
</tr>
<tr>
<td>6 Financial Means</td>
</tr>
<tr>
<td>7 Basic Academic Behaviors</td>
</tr>
<tr>
<td>8 Advanced Academic Behaviors</td>
</tr>
<tr>
<td>9 Academic Self Efficacy</td>
</tr>
<tr>
<td>10 Peer Connections</td>
</tr>
<tr>
<td>1 Learning Communities</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>2 Undergraduate Research</td>
</tr>
<tr>
<td>3 Study Abroad</td>
</tr>
<tr>
<td>4 Senior Capstone/ Culminating Experience</td>
</tr>
<tr>
<td>5 First-Year Experience</td>
</tr>
<tr>
<td>6 Internships</td>
</tr>
<tr>
<td>7 Student Employment</td>
</tr>
<tr>
<td>8 Faculty In Residence</td>
</tr>
<tr>
<td>9 Centers for Academic Excellence</td>
</tr>
</tbody>
</table>
DECOMPOSING A ‘DECOMPOSITION STUDY’
Tools

01 Propensity Score Matching
Testing differences.

02 Decision Trees
Examining patterns.

03 GLM
Testing relationships.

04 SEM
Testing hypotheses.
Propensity Score Matching
What impact and to what degree?

Decision Trees
Identify groups to apply interventions.

GLM
Strategic investment opportunities.

SEM
Identify depth & degree of interventions.
Part II

EXAMPLE OF DECISION TREE- ACADEMIC PROBATION
Females were represented in the majority of the sample.

Over half were college ready at the time of first enrollment.

Two out of five students in the sample were classified as URM.

Over 40% of first-time undergraduates in the sample indicated interest in CNRS majors.
About 74% return to their second year.

Academic Probation?
- Yes 56%
  - First Generation?
    - Yes 60%
    - No 55%

No 82%

On campus 86%

Commuter 82%

College Ready?
- Yes 86%
  - College Ready 82%
    - Pre-collegiate 79%
      - SAT?
        - <=949 84%
        - >949 87%
      - HSGPA?
        - <=2.99 77%
        - >2.99 88%

No 55%

Housed on campus?
- Yes 82.7%
  - URM?
    - Yes 60%
    - No 55%

No 76%

Student Flow Retention 2009-2013
First-time Undergraduates

Commuter 82%

On campus 86%

HSGPA?
- <=2.99 51%
  - >2.99 77%

Housed on campus?
"Rebounders"  "High fliers"

"Potentials"  "Shooting stars"
Part III

STRUCTURAL EQUATION MODELING FOR DUMMIES (LIKE ME!)
What is Structural Equation Modeling (SEM)?

Type of multivariate technique

Another way of doing what you already do—such as regression and correlation...but cooler...

Correlation

Structural Models

Path Analysis

Confirmatory Analysis

Diagram: A triangle with three sides labeled 'Path Analysis,' 'Confirmatory Analysis,' and 'Correlation Structural Models.'
A priori...

Models testing hypotheses...

Researcher needs to know which variables we think affect others...

And the directionality of that affect...
Observed vs latent variables...
All about the covariance, baby...
Can use both in the experimental and non realm (one design to rule them all?)...
...Not about statistical significance *gasp*
Part III

“DECOMPOSING” CNRS FIRST-TIME UNDERGRADS - APPLYING APPROACH
RELATIONSHIP BETWEEN FIRST TERM GPA AND...

First Term GPA

Time Mgt. (.282)
- Shows up on time

Academic Self Efficacy (.315)
- Do well on all problems and assignments
- Persevere on class projects even when there are challenges

Advanced Academic Behaviors (.244)
- Participates in class
- Communicates with instructors outside of class
- Studies on a regular schedule

Basic Academic Behaviors (.366)
- Takes good notes
- Records assignments in calendar

Academic Integration (.633)
- Plans out time
- Makes to do lists

Academic Integration (.445)
- Do well in your hardest class

Academic Integration (.534)
- Attends class
- Turns in homework

Academic Integration (.488)
- Spends time studying
- Studies in a place to avoid distractions

Basic Academic Behaviors (.366)
- Records assignments in calendar

Advanced Academic Behaviors (.244)
- Works on large projects advance of the due date

Academic Self Efficacy (.315)
- Do well in your hardest class

Time Mgt. (.282)
- Shows up on time
Part IV

NEXT STEPS
Continuation & Differentiation

Trees vs Models
• Testing what we learned in the decision trees
• Confirmatory analyses with SEM

Application
• Identify student populations for further study to see how new interventions impact student success
• Academic Probation
  • Early feedback from faculty
  • De-coupling drop-add from census
The Endgame

“Mastering the endgame requires dedication and time,...Precision is also required ...since this is the phase of the game where the result will be decided. ...where players tend to get a little bit tired and unaware of what they’re doing, and can lead to small mistakes that could be costly...stay alert at all times and finish what you started!”
Q&A