From Curriculum to Community:
Encouraging Faculty and Students to Change the World

Periclean Colleges and Universities
Allegheny College • Bates College • Berea College • Bethune-Cookman University
Carleton College • Chatham University • Dillard University • Drew University
Elon University • The Evergreen State College • Goucher College • Hampshire College
Hendrix College • Macalester College • Morehouse College • New England College
The New School • Occidental College • Pace University • Pitzer College • Reed College
Rensselaer Polytechnic Institute • Rhodes College • St. Mary’s College of Maryland
Skidmore College • Swarthmore College • Ursinus College • Wagner College
Whitman College • Widener University • The College of Wooster

Project Pericles appreciates the generous support of
Community Partnerships and Data Analytics
Phong Le, Goucher College
Baltimore City Demographics at a Glance:
A closer look at the composition of Baltimore City.

**Population**
- Total Population: 621,849
- No. of Households: 238,897
- Median Age: 34.6
- % Born outside of US: 8%

**By Age:**
- Under 5: +439
- 5 to 17: 623,711
- 18 to 24: 623,711
- 25 to 34: +11,300
- 35 to 44: 623,711
- 45 to 54: 623,711
- 55 to 64: +6,546
- Over 65: +3,706

**By Race:**
- Hispanic: 4.7%
- White: 30.3%
- Black: 67.6%
- Asian: 2.7%
- Native American, Hawaiian, or Pacific Islander: 4.1%
- Other, Two or More: 2.7%

**Education, Employment and Income**
- Median Household Income: $42,665
- % Unemployment: 11.8%
- % with College or Advanced Degree: 30%
- % with no HS Diploma/GED: 16%

**Income by Education:**
- Less than high school graduate: $19,920
- High school graduate/2 yr: $27,453
- Some college or associate's degree: $33,576
- Bachelor's degree: $44,210
- Graduate or professional degree: $64,974

**Top Employment Sectors:**
- Educational and health services, professional, scientific, management: 20%
- Arts, entertainment, and recreation: 15%
- Retail trade: 10%
- Public administration: 5%
- Finance, insurance, and real estate: 5%
- Number of employees, in thousands

**Housing & Transportation**
- % Owner Occupied: 32%
- % Renter Occupied: 68%
- % Housing Cost Burdened (>30% of income on Housing)

**Housing Units by Tenure:**
- Vacant housing units: 20%
- Owner-occupied: 37%
- Renter-occupied: 43%

Let’s take a look at the data

Languages Spoken in Households of Baltimore County

- English: 86%
- Other Indo-European languages: 4.7%
- Other languages: 1.8%
- Spanish: 4.0%
- Asian and Pacific Island languages: 3.1%

Preferred Language of CCC Clients

- English: 98%
- Greek, Modern (1453-): 1.3%
Opioid Distribution

Data taken from the 911 Database of Baltimore City.

Coding generated by 911 operators.
Who takes CBL courses in statistics? Could selection bias be a good thing?

Lynne Steuerle Schofield
Associate Professor of Statistics, Swarthmore College

Presented at the 2018 AAC&U Annual Meeting
January 25, 2018
## Demographics

<table>
<thead>
<tr>
<th></th>
<th>Stat 31 (Traditional) (n=15)</th>
<th>Stat 41 (CBL) (n=13)</th>
<th>P-value (Fisher’s Exact, Chi-square or t-test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>7 (46.7%) women</td>
<td>6 (46.2%) women</td>
<td>0.978</td>
</tr>
<tr>
<td>Race</td>
<td>3 (20%) URM</td>
<td>2 (15.4%) URM</td>
<td>0.999</td>
</tr>
<tr>
<td>Class Year</td>
<td>0 Fr, 4 So, 6 Jr, 5 Sr</td>
<td>1 Fr, 5 So, 1 Jr, 6 Sr</td>
<td>0.144</td>
</tr>
<tr>
<td>Mean GPA</td>
<td>3.52</td>
<td>3.57</td>
<td>0.764</td>
</tr>
<tr>
<td>Mean math/stat GPA</td>
<td>3.19</td>
<td>3.44</td>
<td>0.378</td>
</tr>
</tbody>
</table>
## Academic Interests

<table>
<thead>
<tr>
<th></th>
<th>Stat 31 (Traditional) (n=15)</th>
<th>Stat 41 (CBL) (n=13)</th>
<th>P-value (Fisher’s Exact or t-test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ Major</td>
<td>10 (66.7%)</td>
<td>4 (30.8%)</td>
<td>0.064</td>
</tr>
<tr>
<td>Interdisciplinary major/minor</td>
<td>2 (13.3%)</td>
<td>7 (53.8%)</td>
<td>0.042</td>
</tr>
<tr>
<td>AP Stat Only</td>
<td>1 (6.67%)</td>
<td>6 (46.2%)</td>
<td>0.029</td>
</tr>
<tr>
<td>Mean num. college math classes</td>
<td>2.53</td>
<td>1.54</td>
<td>0.062</td>
</tr>
<tr>
<td>Mean num. college math/stat courses</td>
<td>3.53</td>
<td>2.23</td>
<td>0.076</td>
</tr>
<tr>
<td>Reported feeling unprepared</td>
<td>3 (20.0%)</td>
<td>7 (53.8%)</td>
<td>0.114</td>
</tr>
</tbody>
</table>
## Why Take CBL vs. Traditional

<table>
<thead>
<tr>
<th></th>
<th>Stat 31 (Traditional) (n=15)</th>
<th>Stat 41 (CBL) (n=13)</th>
<th>P-value (Fisher’s Exact Test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considered other course</td>
<td>6 (40.0%)</td>
<td>8 (61.5%)</td>
<td>0.450</td>
</tr>
<tr>
<td><strong>Real-world application</strong></td>
<td>0 (0.00%)</td>
<td>9 (69.2%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>“Pure” stat course</td>
<td>4 (26.6%)</td>
<td>0 (0.00%)</td>
<td>0.102</td>
</tr>
<tr>
<td>CBL-too much time</td>
<td>2 (13.3%)</td>
<td>0 (0.00%)</td>
<td>0.484</td>
</tr>
</tbody>
</table>
## Student Goals

<table>
<thead>
<tr>
<th>Goal</th>
<th>Stat 31 (Traditional) (n=15)</th>
<th>Stat 32 (CBL) (n=13)</th>
<th>P-value (Fisher’s Exact test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain real world experience</td>
<td>0 (0.00%)</td>
<td>9 (69.2%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Learn stat modeling</td>
<td>11 (73.3%)</td>
<td>6 (46.2%)</td>
<td>0.246</td>
</tr>
<tr>
<td>Fulfill writing requirement</td>
<td>5 (33.3%)</td>
<td>0 (0.00%)</td>
<td>0.044</td>
</tr>
</tbody>
</table>
Conclusions

• CBL students self-select into CBL courses
• CBL students differ in
  – prior mathematical and statistical training,
  – needs,
  – goals
• CBL instructors need to be cognizant of different training and needs of their students
• CBL courses may provide a place for recruiting non-traditional students into the statistical pipeline.
The Making of Stat 41

**Stat 31: Data Analysis and Visualization**
- Cleaned data from instructor
- Missing part of the research process

**Stat 41: Data Analysis Policy Projects**
- Data from local organizations
- Expose students to data analysis challenges

Added CBL
Stat 41: A Win-Win Situation

Opportunity for real-world application of statistical skills and methods

Organizations

Students

Free statistical consulting on problems of direct importance to the organizations
CBL vs Traditional Students?

- Are students who choose to take a CBL stat course different from those who choose a more traditional course?

- How are they different?

- What do the differences mean for instructors of CBL courses?
Data

• Demographic data (e.g., gender, race, class year)

• Institutional data (e.g., GPA, prior courses taken)

• Self-report end-of-the-year survey data
  – Students’ goals in taking the course
  – Students’ reasons for choosing the course they did
## Stat 31 vs Stat 32

<table>
<thead>
<tr>
<th>Differences</th>
<th>Stat 31 (Traditional)</th>
<th>Stat 32 (CBL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments and Projects</td>
<td>• 5 in-class “consultant” lab write-ups</td>
<td>• Community org based, semester-long project</td>
</tr>
<tr>
<td></td>
<td>• Final paper student-selected topic</td>
<td></td>
</tr>
<tr>
<td>Similarities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topics</td>
<td>EDA; regression; ANOVA; ANCOVA; model building; logistic regression; PCA; HLM</td>
<td></td>
</tr>
<tr>
<td>Pre-requisites</td>
<td>Stat methods, math stat, intro econometrics, or AP statistics</td>
<td></td>
</tr>
<tr>
<td>Tests</td>
<td>In-class midterm and final</td>
<td></td>
</tr>
<tr>
<td>Problem sets</td>
<td>Bi-weekly problem sets</td>
<td></td>
</tr>
</tbody>
</table>
Challenges

- Finding organizations
- Organization and college schedules
- Confidentiality of data
- Course organization