Analysis of Multiple Years of NSSE Data: Tips and Strategies

NSSE Regional User’s Workshop
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Overview
- Introduction
- Multi-Year NSSE Data Considerations
- Prepare NSSE Data for Multi-Year Analysis
- Analytical Models
- Visual Displays
- Wrap-up and Questions

Multi-Year NSSE Participation

<table>
<thead>
<tr>
<th>Total Years of NSSE Participation (2000-2007)</th>
<th>Number of Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year</td>
<td>309*</td>
</tr>
<tr>
<td>2 years</td>
<td>260</td>
</tr>
<tr>
<td>3 years</td>
<td>218</td>
</tr>
<tr>
<td>4 years</td>
<td>160</td>
</tr>
<tr>
<td>5 years</td>
<td>96</td>
</tr>
<tr>
<td>6 years</td>
<td>65</td>
</tr>
<tr>
<td>7 years</td>
<td>46</td>
</tr>
<tr>
<td>8 years</td>
<td>31</td>
</tr>
</tbody>
</table>

* 108 first participated in 2007

Guiding question

How do we assess and interpret changes in our engagement scores over time?

Multi-Year NSSE Data Considerations

- Five General Considerations
- “Example College”
- Data Quality Considerations
- Which Multi-Year Approaches are Recommended?

General Considerations

1. Engagement scores are process measures.
2. Engagement scores depend on context.
3. Analysis requires a baseline (criterion- or norm-referenced?)
4. Are the measures the same?
5. Assume stability or change?
Stability or Change?

“Example” College

Goal in 2002 –

“To enhance student engagement across all five NSSE benchmarks over the next five years compared with similar Carnegie institutions as well as our own criterion-referenced measures.”

“Example” College

How much do scores need to change in order for the change to be real?

Data Quality Considerations

- Errors associated with comparing estimates
  - How good are those estimates?
  - Raw difference scores - both measures contain error
- Response rate
- Sample size
  - Sampling Error (frequencies) (depends on sample and population sizes)
  - Standard Error (means) (depends on variance and sample size)

Sampling Error

Use when comparing frequencies.

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>lower bound</td>
<td>45%</td>
<td>53%</td>
</tr>
<tr>
<td>point estimate</td>
<td>50%</td>
<td>60%</td>
</tr>
<tr>
<td>upper bound</td>
<td>55%</td>
<td>67%</td>
</tr>
</tbody>
</table>
**Sampling Error**

Use when comparing frequencies.

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>lower</td>
<td>+/- 5%</td>
<td>+/- 7%</td>
</tr>
<tr>
<td>estimate</td>
<td>45%</td>
<td>53%</td>
</tr>
<tr>
<td>upper</td>
<td>55%</td>
<td>67%</td>
</tr>
</tbody>
</table>

**Multi-Year Approaches**

2003

FIRST-YEAR

SENIOR

Cross-sectional comparison of different cohorts

2006

FIRST-YEAR

SENIOR

Longitudinal tracking of same cohort (panel data)

**Multi-Year Approaches**

2003

FIRST-YEAR

Institutional Peers

2006

FIRST-YEAR

Institutional Peers

Tracking results of peer comparisons

**Multi-Year Approaches**

2003

FIRST-YEAR

SENIOR

Comparing estimates of class populations

2006

FIRST-YEAR

SENIOR

-2%
NSSE Survey & Reporting Changes

Tools to help with:

- Tracking variable changes
- Merging datasets
- Using Benchmark variables

Beware, Variables Change

Which of the following have you done or do you plan to do before you graduate from your institution?

Participate in a learning community

2002
1) Yes
2) No
3) Undecided

2004
1) Done
2) Plan to do
3) Do not plan to do
4) Have not decided

Tracking Variable Changes

- Excel-based tool
- What survey items are comparable?
- Changes captured
  - Question wording
  - Response set
  - Benchmark inclusion
- "Filter" on multiple fields

Merging Datasets

- SPSS syntax and scripts are available
- Steps to take...
  - Identify comparable variables
  - Update syntax with variable list
  - Run script through GUI, then run syntax

Using Benchmark Variables

<table>
<thead>
<tr>
<th>Level of Academic Challenge</th>
<th>ACL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active &amp; Collaborative Learning</td>
<td>ACL</td>
</tr>
<tr>
<td>Supportive Campus Environment</td>
<td>SCE</td>
</tr>
</tbody>
</table>

Dataset Checking

- Despite available tools, check the data!
- Review missing values for each survey item
- Run cross tabulation between items and year
Models of Multi-Year Analyses

- Descriptive Statistics
- Quick Effect Size Analysis
- T-test
- Analysis of Covariance (ANCOVA)
- Multiple Regression
- Multi-Level Analyses

Initial Analysis

- Descriptive Statistics
- Identifying consistent trends
- Identifying unusual trends
- No significant testing involved
- Compare the mean or median
- SPSS line chart
- Excel spreadsheets

Identifying Trends

![Graph showing trends from 2001 to 2006]

Quick Effect Size Analysis

- A quick way of making multiple year comparison
- A rough estimation
- Effect Size calculation

\[
ES = \frac{M_1 - M_2}{SD_{pooled}}
\]

Differences between Two Years

- Independent Sampled T-test
- Significant Test
- Effect Size

\[
T-TEST
GROUPS = year(2004 2006)
/MISSING = ANALYSIS
/VARIABLES = ACa
/Criteria = CI(.95)
\]

Compare Multiple Years

- ANCOVA
  - Benchmarks or individual items as dependent variables
  - Year as the independent variable
  - Student characteristics as covariance
- Multiple Regression
  - Benchmarks or individual items as dependent variables
  - Year and student characteristics as independent variables
**Multi-Level Analyses**

- Hierarchical Linear Modeling (HLM)
- DV: Student-level benchmark scores
- Level-1 IV: Student characteristics
- Level-2 IV: School-wise characteristics and year

**One Item**

![Level of Academic Challenges FY](chart)

**One Item by Groups**

![Level of Academic Challenges FY by Groups](chart)

**Two Items by Groups**

![Level of Academic Challenges FY by Groups](chart)

**Stacked Bar Chart**

![FY: Community Project as part of a class](chart)

**Bar Chart with Groups**

![FY: Community project “never”](chart)
Questions & Discussion

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