

Measuring Change: Using Multi-Year Analysis of National Survey of Student Engagement Results to Assess Educational Improvement



Jillian Kinzie
Alexander McCormick
Ali Korkmaz
Jennifer Buckley
Indiana University Center for
Postsecondary Research and NSSE
AIR Forum 2009, Atlanta

Your Interest in the Topic of Change

To what extent has your campus...

1. Used NSSE to inform institutional improvement efforts?
2. Used multiple NSSE administrations to measure effectiveness of reform?
3. Observed a change in NSSE data that likely reflects the influence of the reform?
4. Seen results dip unexpectedly following a change on campus?

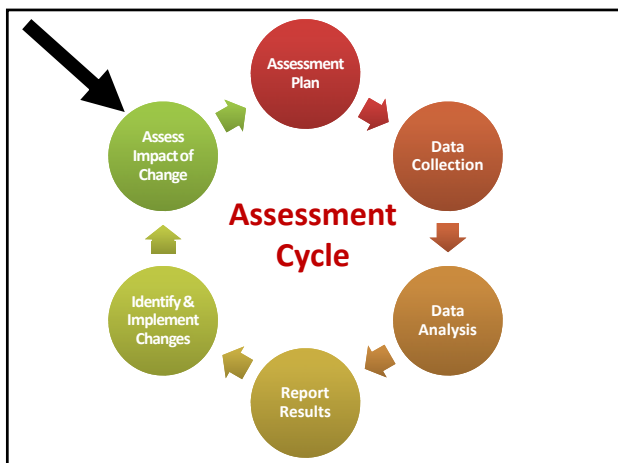


Context for Assessment & Improvement

- National Institute of Education's, *Involvement in Learning (1984)*, emphasized improving educational quality and challenged institutions to adopt organizational strategies, policies, & processes to maximize the use of evidence to inform institutional improvement.
- Since 1984, commitment to and professionalization of assessment practice has steadily increased.
- Recent press to demonstrate educational effectiveness and that assessment activities impact institutional improvement initiatives.

Current Challenge

Although institutions of higher education have increased *assessment activities*, there is less evidence that they have fully implemented the phase of the assessment loop that involves following up to see whether the changes undertaken have produced improvements



Campus Improvement & Change

- Calls to improve quality in undergraduate education have prompted institutions to launch educational reforms (Kezar & Eckel, 2002).
- Repeated assessments over time affords opportunity to evaluate progress, feed results back into improvement initiatives, thereby closing the assessment loop (Maki, 2004).

Since 2000: The NSSE Challenge

How to use data to improve quality in undergraduate education

- ✓ Document strengths
- ✓ Identify opportunities for improvement
- ✓ Motivate wider use of effective practices
- ✓ Strengthen the learning environment



Impetus for Study

- **Opportunity:** 2009 is the 10th NSSE survey year. Institutions with multiple years of NSSE makes it possible to assess change (or stability) in engagement over time.
 - *To what extent can institutions use NSSE to demonstrate improvement and the impact of educational reform efforts?*
 - *For institutions with NSSE data across multiple years, is it possible to detect changes on campus in NSSE results?*

Conceptual Framework

- Informed by treatments of organizational learning and intentional change in organizations
- **Organizational learning** provides broad frame - how institutions acquire and interpret information, make choices, and then interpret their experience
- **Literature on change** provides sharper focus on goal-directed change (e.g., performance improvement).
- From an evaluation perspective, **organizational learning involves intentional, goal-directed change that uses information or feedback to make changes** (Torres & Preskill, 2002).

Two Phases of Study

1. **Detecting Change:** Test different statistical methods to identify institutions where select NSSE scales show a significant change.
2. **Accounting for and Understanding Change:** After institutions are identified as showing change, can we learn more about what the institution did to effect change?

Research Design

- Various ways to interpret change in institutional scores over time.
- Singer & Willet (2003) advise: 3 or more waves of data, an outcome whose values change over time, and sensible metric for clocking time.
- Focused on NSSE scales or “scalelets” – more precise measures in terms of areas of interest, and change is more likely to be visible via specific scales.

NSSE Scales

- “Scalelet scores are most useful to academic affairs, student affairs, and assessment professionals charged with taking NSSE results and translating them into a series of action items to improve the student experience on campus”

Pike, G. R. (2006). The convergent and discriminant validity of NSSE scalelet scores. *Journal of College Student Development*, 47 (5), 551-564.

NSSE Scales

- Higher Order Thinking
- Integrative Learning
- Course-Related Interactions with Faculty
- Out of Class Interactions with Faculty
- Diversity
- Active Learning Experiences
- Collaborative Learning Experiences
- Environmental Emphasis
- Environmental Support for Academic Success
- High Impact Practices

NSSE Scales

NSSE Scales and Scaletts

• Smaller, more reliable measures

• NSSE Scale properties: on NSSE website

“Researchers” tab

• Deep approaches to learning

[see NSSE Annual Reports 2006 – 2008]

• Diversity experiences (1e,u,v;10c,11l)

[Pike, G. R., & Kuh, G. D. (2006). Relationship among structural diversity, informal peer interactions and the perceptions of the campus environment. The Review of Higher Education, 29 (4), 425-450.]

• Scales to measure perceived gains in social, practical, and academic competence

[Zhao, C. & Kuh, G. D. (2004). Adding value: Learning communities and student engagement. Research in Higher Education, 45 , 115-138.]



Data Sources

- Institutions with 3 or more data points from 2004 through 2008
- Student level data
- 432 U.S. institutions
 - 18% Doctoral, 46% Master’s, 33% Baccalaureate
 - 43% Public and 7% MSI
 - 27% very small, 32% small, 19% medium, 23% large

Data

- 383,013 first-year students and 382,910 seniors
- 43% male, 77% of FY 19 or younger, 63% of SR were 24 or younger
- Average response rate: 37.9%
- Average respondents per institution: 282 FY and 304 SR

Data Quality Considerations

- Response rates
- Sampling errors
- Fluctuations in number of responders from year to year
- Mode of survey administration



Two Approaches

- Analyzing change within a single institution
- Analyzing change across multiple institutions

Single Institution Basic Analysis

- **T-test and Effect-size within enrollment size**
 - Check significance results within enrollment size
 - t-test is affected by large N and effect-size does not consider N
 - At least two year span (04-06, 05-07, or 04-07)
 - Check the overall trend
 - No zigzag across years
 - Check data quality indices

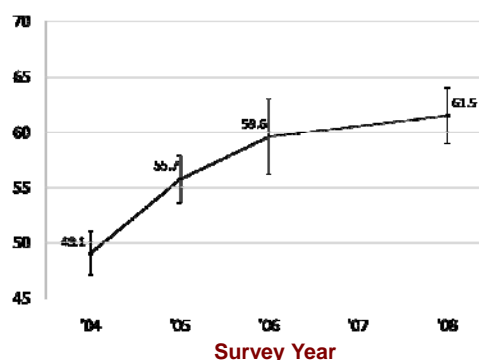
Single Institution Multivariate Analysis

- **If changes seen in the basic analysis**
- **Controls can be added**
- **Regression as an example at AIR: Griffith, Wang, and Ning (2009)**

Conclusions for Institutions

- **It is possible to detect change in NSSE scores using t-tests, effect sizes, regressions**
- **Institutions can replicate our analyses**
- **Identify scales and variables that might be impacted by campus reform initiatives – examine scores over time**

Example: Change?



Importance of Assessing Change at Your Campus

- **If assessment doesn't help improve teaching and learning activities and ultimately, student success... *why bother with it?***
- **Implementing large-scale, transformational change in colleges and universities is difficult – how can we use evidence of effectiveness to inspire action?**
- **Campuses that maximize their NSSE results, take action to improve undergraduate experience, and gauge the extent to which change has an effect**

Multi-Year Data Analysis Guide

- **What is the best approach to using results from multiple NSSE administrations?**
- **More than 75% of NSSE participating institutions have administered the survey more than once.**
- **Some look for changes in the way their current students are engaged, some track possible trends, and others evaluate specific campus initiatives.**

National Survey of Student Engagement
NSSE Multi-Year Data Analysis Guide

About this Guide

Over the past 10 years, more than 100 institutions have administered the NSSE survey more than once. This document provides a guide to analyzing the results of multiple administrations of the survey.

What is the best approach to using results from multiple NSSE administrations?

More than 75% of NSSE participating institutions have administered the survey more than once.

Some look for changes in the way their current students are engaged, some track possible trends, and others evaluate specific campus initiatives.

Analysis: Multiple Institutions

- HLM due to multiple institution context
 - 3 levels: Students, time, and institution
- Not SEM growth model because not all institutions have 5 points: We did not want to impute missing data points

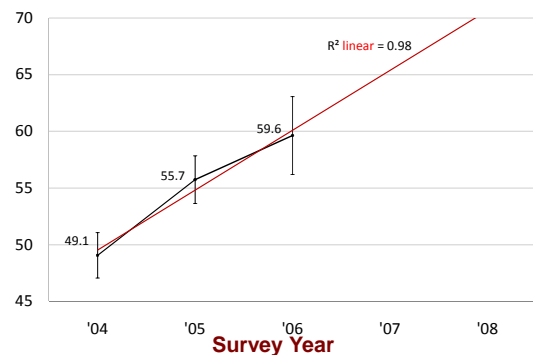
HLM

- For each scale and scalelet, for first-year and senior data separately
- Random slope and random intercept to allow variation between institutions
- Check residual files to identify change: OLS predicted slope
 - Level-1 Model (student)
Active_Learning_{ijk} = $\pi_{0jk} + \epsilon_{ijk}$
 - Level-2 Model (time/year)
 $\pi_{0jk} = \beta_{00k} + \beta_{01k}(\text{Year}_{jk}) + r_{0jk}$
 - Level-3 Model (institution level)
 $\beta_{00k} = \gamma_{00c} + u_{00k}$
 $\beta_{01k} = \gamma_{01c} + \gamma_{011}(\text{Inst.Size}) + u_{01k}$

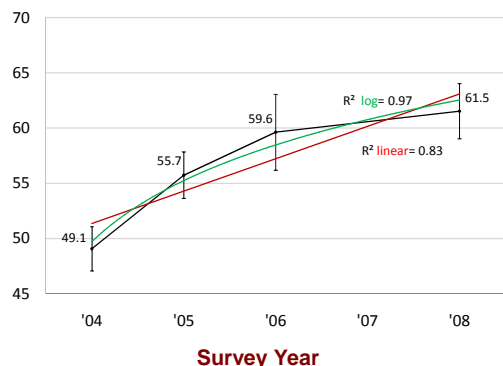
Detect Different Types of Patterns

- In a multi-institutional and multi-year context
- More than one type of trend possible especially if there are 4 or more points
 - HLM linear approach can detect linear trends with 3 or 4 points but it is possible to have different trends if more than 4 data points
 - With 2004-2007 data sets, HLM was helpful with linear approach but not with 2004-2008 datasets

Example: Linear or Non-Linear



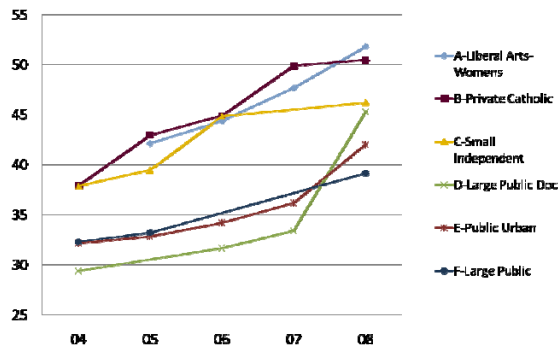
Example: Linear or Non-Linear



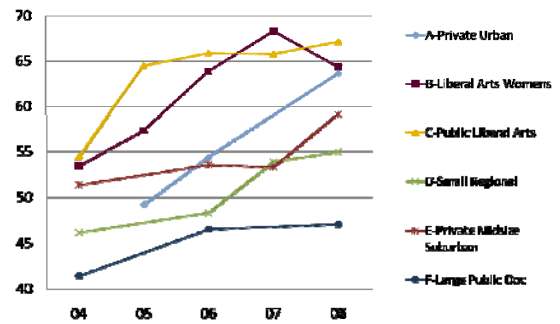
Criteria for Identifying Change

- Use two level HLM to produce adjusted school mean scale score for each year
- In Excel, calculate R² values for each institution's scales and scalelets
 - Linear, logarithmic, exponential, and power
- At least one R² value greater than .70 & medium effect size difference between highest and lowest values
- Check data quality indicators

Example: Change at Several Institutions First Year Active Learning Scale



Example: Change at Several Institutions Seniors Diversity Scale



Can Change be Detected in NSSE Scores?

- **Yes!** Something happened on these campuses and NSSE scores detect it.
- **Additional corroboration:** Many of the institutions with positive trends have shared their story about using NSSE data to assess and improve the learning environment.

Observations about Change at Institutions

- Majority of institutions show positive trend in *at least one* scale or scalelet
- Number of institutions showing change varies by scale (easy to change some scales? Less impetus to change?)
- Patterns of systematic change:
 - Parallel improvement - same scale for FY and SR (does this reflect institutional focus on activity?)
 - Focused improvement by class year - FY or, SR
 - Improvement around a theme (classroom initiatives, faculty-related topics, academic support)

Next Steps

- Add 2009 results to add another data point and to include more institutions in study.
- Identify institutions with positive trends.
- Conduct Interviews and Qualitative Case Studies to provide comprehensive information about the process of institutional improvement and change.
- Document processes for improvement and change.

To Ponder about Improvement and Change...

Organizations that improve... create and nurture agreement on what is worth achieving, and they set in motion the internal processes by which people progressively learn how to do what they need to do in order to achieve what is worthwhile.

(Elmore in Fullan, 2001, p. 125)

Improvement & Positive Change

- Implementing large-scale, transformational change in colleges and universities is difficult
- Link data to develop a solid foundation for action
- Improvement begins in small ways – *so start something!*
- Evaluate effectiveness of action. Celebrate and tweak.

CHANGE
WE CAN BELIEVE IN

Discussion Questions?

Our website:

www.nsse.iub.edu

www.nsse.iub.edu/institute

Contact us:

nsse@indiana.edu

812.856.5824



National Survey
of Student Engagement