National Survey of Student Engagement

What does it all mean?

Presented by

Nate Tymes

Research Consulting Center

Purpose

- To define some of the measures used in the study

- To review some of the basic statistical information presented

- To explain how to interpret the data

The Sample

Ferris student population   ~ 13K

Sample ~1300 of Freshmen and Seniors

~ 10% of the student population

Could be doubled with removal of sophomores and juniors

The sample is reliable

Maybe a longitudinal study would enhance the study at a later date

3 Essential Questions

- Is there any relationship?

- What kind of relationship?

- How strong is the relationship?

Statistical Significance

- Are the results different than what would be expected by chance?

- The mean differences are larger than what is expected by chance

- The smaller the significance level the smaller the likelihood that difference is due to chance

- Significance is a function of the sample size

- Check in conjunction with effect size

Interpreting p - values

- A way of determining Statistical Significance

- The probability of observing a mean value as extreme or more extreme than the mean we have.

- Common p-values

p – values	Interpretation	Study symbols
P < 0.05	Strong evidence	*
P < 0.01	Overwhelming evidence	**
P < 0.001	Extremely Overwhelming evidence	***

Interpreting Effect Size

• Practical significance of the difference between the means

• Cohen's d - the standardize difference between the institution's mean and comparison groups mean divided by the pooled standard deviation

• Cut-off values based on those originally proposed by Cohen and those reflected in the empirical data of NSSE (2007)

• "Coarse set of … minimum values" used to interpret the magnitude of an effect size

• Examine the differences within the context of the rest of the data

Interpreting Effect Size

	Effect Size Thresholds
Trivial	0 to 0.09
Small	0.10 to 0.29
Medium	0.30 to 0.49
Large	0.50 to 0.69
Very Large	0.70 or more

Based on "Contextualizing NSSE Effect Sizes: Empirical Analysis and Interpretation of Benchmark Comparisons
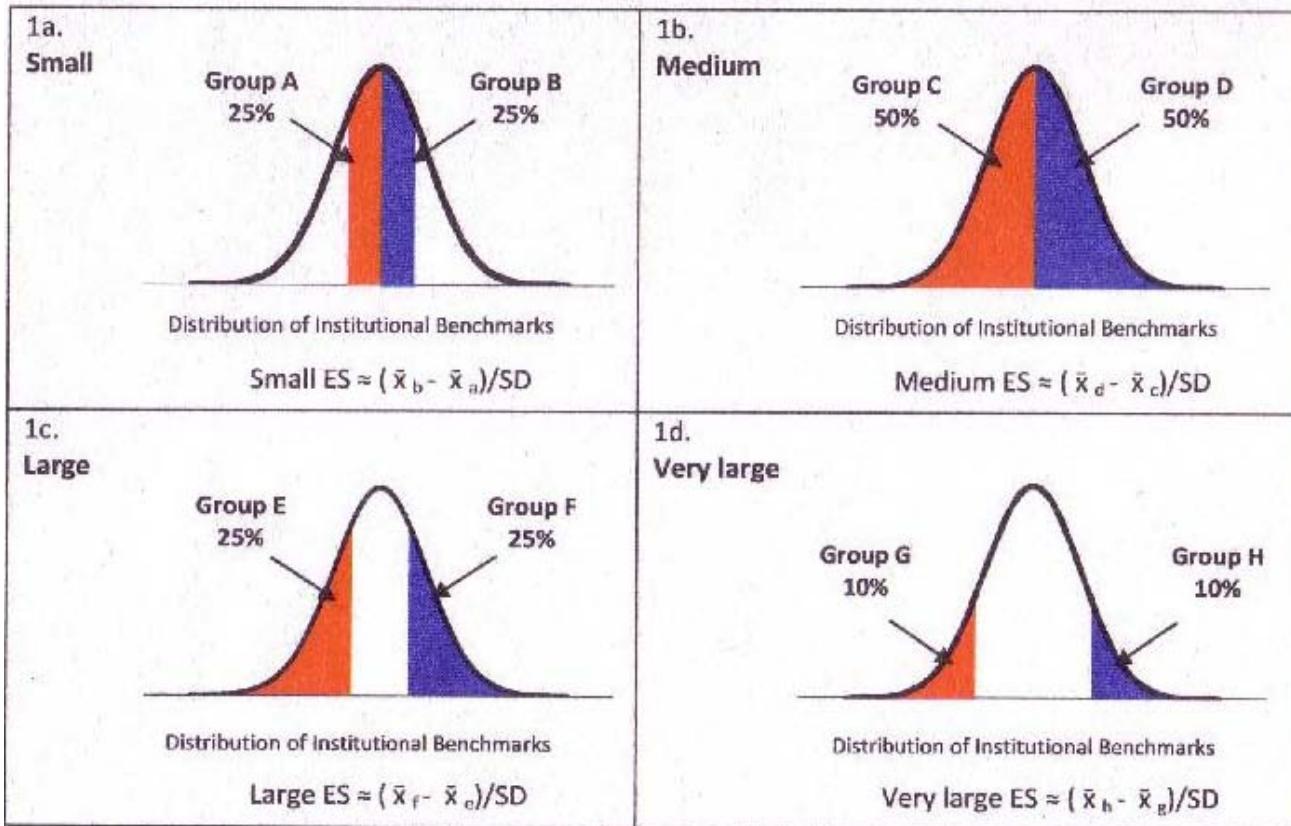
"+" indicates our institution's means was greater - good result
"-"   indicates our institution lags behind – item may warrant attention

Interpreting Effect Size

Figures 1a- 1d
Illustration of Four Model Comparison Groups for Determining Empirically-Based Effect Size
Thresholds Based on the Distribution of NSSE Benchmarks

1a. Small

Group A 25% Group B 25%

Distribution of Institutional Benchmarks

Small ES $\approx (\bar{x}_b - \bar{x}_a)/SD$

1b. Medium

Group C 50% Group D 50%

Distribution of Institutional Benchmarks

Medium ES $\approx (\bar{x}_d - \bar{x}_c)/SD$

1c. Large

Group E 25% Group F 25%

Distribution of Institutional Benchmarks

Large ES $\approx (\bar{x}_f - \bar{x}_e)/SD$

1d. Very large

Group G 10% Group H 10%

Distribution of Institutional Benchmarks

Very large ES $\approx (\bar{x}_h - \bar{x}_g)/SD$

Note: $\bar{x}_a$ through $\bar{x}_h$ are the mean benchmark scores of the students attending institutions within groups A through H.
SD=Standard deviation (pooled).

Comparisons to Other Institutions
Interpreting the Frequency Distribution

			First-Year Students								Seniors							
			Ferris State		Selected Peers		Carnegie Class		NSSE 2010		Ferris State		Selected Peers		Carnegie Class		NSSE 2010	
	Variable	*Response Options*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*
[1a.] Asked questions in class or contributed to class discussions	CLQUEST (ACL)	Never	1	*2%*	35	*3%*	43	*2%*	493	*3%*	5	*5%*	40	*2%*	33	*1%*	538	*2%*
		Sometimes	21	*39%*	538	*39%*	597	*31%*	6,464	*34%*	28	*26%*	587	*26%*	661	*22%*	8,167	*25%*
		Often	21	*39%*	471	*34%*	675	*36%*	6,743	*36%*	40	*37%*	771	*34%*	940	*31%*	10,226	*32%*
		Very often	11	*20%*	329	*24%*	581	*31%*	5,172	*27%*	34	*32%*	886	*39%*	1,406	*46%*	13,256	*41%*
		Total	54	*100%*	1,373	*100%*	1,896	*100%*	18,872	*100%*	107	*100%*	2,284	*100%*	3,040	*100%*	32,187	*100%*

Comparisons to Other Institutions
Interpreting the Benchmark Statistics

First-Year Students

	Mean Statistics			Distribution Statistics					Reference Group Comparison Statistics			
						Percentiles [d]			Deg. of Freedom [e]	Mean Diff.	Sig. [f]	Effect size [g]
	Mean	SD [b]	SEM [c]	5th	25th	50th	75th	95th				
LEVEL OF ACADEMIC CHALLENGE (LAC)												
Ferris State (N = 80)	**55.1**	10.3	1.1	40	48	55	63	73				
Selected Peers	**53.2**	12.7	.4	32	44	53	62	74	100	1.9	.114	.15
Carnegie Class	**55.1**	13.4	.3	33	46	56	64	77	92	.1	.955	.01
NSSE 2010	**55.7**	13.3	.1	33	47	56	65	77	80	-.5	.651	-.04
ACTIVE AND COLLABORATIVE LEARNING (ACL)												

Within-Institution Comparisons
Interpreting the Frequency Distribution

Frequency Distributions: First-Year Students

			Arts and Humanities		Biological Sciences		Business		Education		Engineering		Physical Sciences		Professional		Social Sciences		Overall [b]	
Variable	*Response Options*		*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*	*Count*	*%*
1c. Prepared two or more drafts of a paper or assignment before turning it in	REWROPAP																			
		Never	4	5%	3	15%	6	11%	1	3%	1	3%	1	14%	18	10%	2	9%	52	8%
		Sometimes	30	38%	5	25%	14	26%	11	34%	7	19%	1	14%	46	25%	5	22%	167	26%
		Often	23	29%	9	45%	18	33%	11	34%	14	39%	4	57%	72	39%	7	30%	240	37%
		Very often	22	28%	3	15%	16	30%	9	28%	14	39%	1	14%	47	26%	9	39%	187	29%
		Total	79	100%	20	100%	54	100%	32	100%	36	100%	7	100%	183	100%	23	100%	646	100%

Within-Institution Comparisons Interpreting the Benchmark Statistics

	First-Year Students										Seniors								
	Arts and Humanities	Biological Sciences	Business	Education	Engineering	Physical Sciences	Professional	Social Sciences	Overall [b]		Arts and Humanities	Biological Sciences	Business	Education	Engineering	Physical Sciences	Professional	Social Sciences	Overall [b]

LEVEL OF ACADEMIC CHALLENGE (LAC)

	Arts and Humanities	Biological Sciences	Business	Education	Engineering	Physical Sciences	Professional	Social Sciences	Overall	Arts and Humanities	Biological Sciences	Business	Education	Engineering	Physical Sciences	Professional	Social Sciences	Overall
Mean	55.1	50.3	51.3	48.5	53.2		51.8	54.3	51.6	54.9	51.6	52.2	57.9	53.4		58.3	61.0	55.2
SD[c]	10.3	11.4	11.0	14.3	15.7		11.0	13.2	12.3	13.6	13.4	12.9	12.3	13.3		14.3	14.6	13.8
SEM[d]	1.15	2.49	1.50	2.53	2.62		.81	2.76	.50	1.74	1.92	1.25	1.43	1.42		.95	3.05	.47
N	80	21	54	32	36		184	23	612	61	49	107	74	88		226	23	873

The Comparisons

1. Bar charts – are the means really different?
   check significance and effect size

2. The means – check significance and effect size
   does it really mean anything?

3. Institutional scores – check significance and effect size
   check the test item frequencies
   are they measuring something that is important to us

4. Check for trends – gains/losses

5. Box and whisker plot - check the center and variability