Big Can Be Great:
Enhancing Undergraduate Education
at Research-Extensive Universities

John F. Ryan, Ph.D.
The Ohio State University
Office of Academic Affairs
203 Bricker Hall
190 N. Oval Mall
Columbus, Ohio 43210
Phone: (614) 247-6234
E-mail: ryan.19@osu.edu

Big Can Be Great:
Enhancing Undergraduate Education
at Research-Extensive Universities

Although recent results from the National Survey of Student Engagement (NSSE) suggest there is considerable variation in levels of undergraduate student engagement within Carnegie institutional classifications, research also suggests different classifications of institutions exhibit different types (Pike and Kuh, 2005) and levels (Pike, Kuh and Gonyea, 2003) of student engagement. However, an important question that requires additional examination is the potential relationship between particular engagement variables and various outcomes of interest to students and institutions. Given the time and resource limitations that faculty, staff, and administrators face in their efforts to improve academic quality, analyses that move beyond norm-based or statistical comparisons and test empirical relationships within theory-based models of quality in undergraduate education may provide a more effective means to focus improvement efforts. This study examines student-reported learning and development factor scores, the likelihood of persistence, and students' ratings of their overall educational experience based on NSSE responses from over 1,500 first-year and senior students in 2004 at a large, research-extensive university. Using Chickering and Gamson's (1987) "Seven Principles for Effective Practice in Undergraduate Education" as a conceptual framework to guide variable selection, the results of four models suggest that a high level of academic challenge, institutional emphasis on academic work and studying, and prompt feedback on academic performance may provide the most productive avenues for enhancing the impact and quality of undergraduate education at large, research-extensive universities. Possible explanations and potential implications of these and other findings for students, faculty members, institutional leaders, policymakers, and accrediting bodies are discussed.

KEYWORDS: Student engagement, student persistence, student development, student learning, undergraduate education, college impact, academic quality, best practices

INTRODUCTION

Student engagement is a well-established concept in the research literature on higher education quality, student development, and student learning (Pike, 2004; Kuh, 2002; Kuh, 2001; Ku and Hu, 2001a; NSSE, 2001). Its impact is most evident in the creation and growth of the National Survey of Student Engagement (NSSE) as an evaluative instrument designed to gauge best practices and experiences that higher education research indicates are important to enhancing student learning and development (Astin, 1993; Kuh, 2003; Pace, 1984; Pascarella and Terenzini, 1991). For those are dissatisfied with the utility and insight gained from traditional "resource and reputation" models of higher education quality and concerned with trends in the accountability movement, paying greater attention to best practices that enhance student learning represents a welcome development in the quest to better define and evaluate academic quality. In fact, a series of recent issues of the well-known college ranking guide published by U.S. News and World Report (USNWR) have published voluntary reports of specific NSSE results from some colleges and universities (USNWR's "America's Best Colleges", 2002-2005) . These results included student reports of the extent to which they participated in or experienced various activities that can enhance student learning and development such as asking questions in class, receiving prompt feedback on coursework, having discussions with instructors outside of class, writing papers, and participating in research.

The theoretical roots of the student engagement as an important factor in student learning and development are strong as well. For many years, researchers and higher

education leaders have given a great deal of attention to the concepts of student involvement (Astin, 1993), faculty-student interaction (Pascarella and Terenzini, 1991), and student academic and social integration (Spady, 1971; Tinto, 1975; Tinto, 1993) as explanations for the impact of college on students and as predictors of student persistence and development. Although the concept of student engagement contains some complementary and common characteristics with these concepts, student engagement and NSSE are anchored most directly in Chickering and Gamson's (1987) "Seven Principles for Effective Practice in Undergraduate Education" and focus on a fairly defined set of educational interactions and experiences among students, faculty members, and their institutions. These principles are:

1. Student-faculty contact
2. Cooperation among students
3. Active learning
4. Prompt feedback
5. Time on task
6. Communication of high expectations
7. Respect for diverse talents and ways of learning

However, in spite of the increased attention being given to student engagement as a determinant and indicator of undergraduate education quality, leaders and researchers have focused less attention to the examination of the particular issues that different kinds of institutions face in their efforts to enhance undergraduate education, including large, research-extensive universities. Although recent results from the National Survey of Student Engagement (NSSE) suggest there is considerable variation

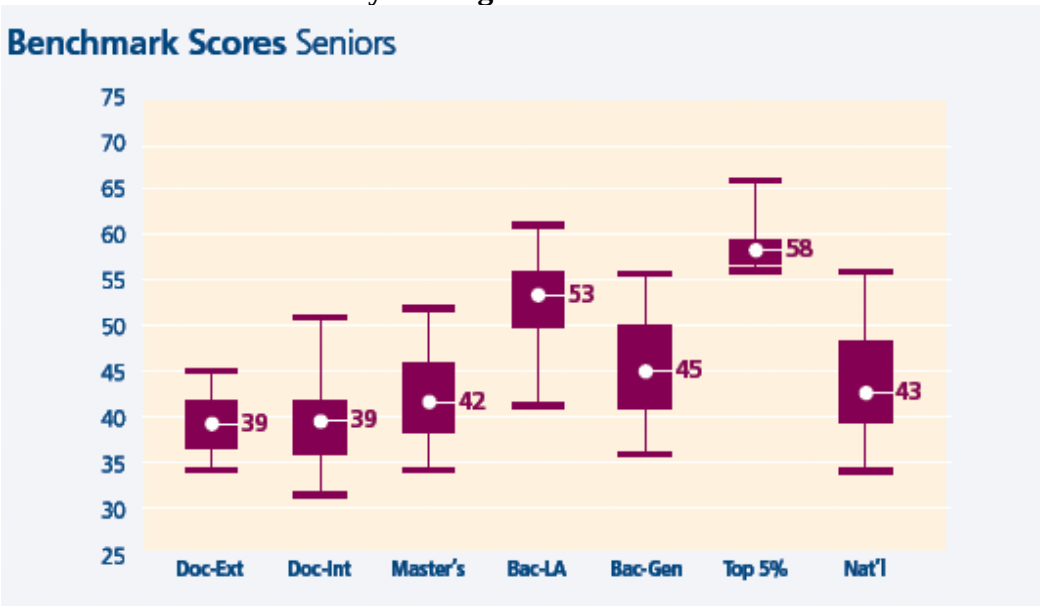
in levels of undergraduate student engagement within Carnegie institutional classifications, research also suggest different classifications of institutions exhibit different types (Pike and Kuh, 2005) and levels (Pike, Kuh and Gonyea, 2003; Umbach and Wawrzynski, 2005) of student engagement (see Figure 1). However, an important question that requires additional examination is the potential relationship between particular engagement variables and various outcomes of interest to students, institutions, and external constituencies. Given the time and resource limitations that faculty, staff, and administrators face in their efforts to improve academic quality, analyses that move beyond norm-based or statistical comparisons and test empirical relationships based on theory-based models of quality in undergraduate education may provide a more effective means to focus improvement efforts. Furthermore, the literature has paid even less attention to how specific practices and experiences that shape student engagement may be related to and support a variety of desired institutional and student goals and whether or not certain practices may be more critical to such outcomes. The issue of whether of not there may be "synergies of engagement and best practice" across a variety of institutional and student goals also begs to be examined.

PURPOSES AND RESEARCH QUESTIONS

This study seeks to extend the range of study of student engagement, college impacts on students, and academic quality and to address some gaps in the research literature by examining student engagement variables and their relationship to institutional impacts on student learning, student development, student persistence, and student ratings of the overall educational experience.

The results of this study may be useful to both researchers of and leaders at large, research-extensive universities as both groups seek to understand and enhance academic

FIGURE 1. Student-Faculty Interaction Senior Benchmark Scores by Carnegie Classification



Source: Student Pathways to Collegiate Success, NSSE 2004 Annual Survey Results (http://www.iub.edu/~nsse/2004_annual_report/pdf/annual_report.pdf).

quality within the context of a complex institutional environment defined by multi-faceted missions and aims in teaching, research, and service. In addition, this study examines the utility of exploring student engagement and the impact of the college experience within a specific institution type. Differences in institutional characteristics such as size and mission may suggest unique issues and needs related to enhancing the impact of academic programs (Toutkoushian and Smart, 2001). Therefore, faculty, administrators, and students at large, research-extensive institutions may need to focus on specific strategies to enhance institutional impact, student outcomes, and academic quality.

Finally, there are competing views regarding how to define and improve academic quality. One approach can be described as a business-centered "customer service" view of institutional quality that seeks to enhance students' satisfaction with their educational experience. Efforts to "raise the bar" via high expectations and rigorous academic requirements characterize a second general approach. Simply put, do efforts to increase student satisfaction and academic challenge represent incompatible, competing, and even contradictory aims? This study seeks to examine this question in more detail and attempt to assess the extent to which these aims actually work against each other.

Given these overall purposes, this study sought to answer the following questions:

1) What is the relationship between various components of student engagement and a) student learning b) student development c) student retention and d) student ratings of their entire educational experience?
2) What particular student engagement practices are most important?
3) Do attempts to enhance student satisfaction and increase academic expectations of students represent competing and contradictory aims?
4) What are the theory, practice, and policy implications for researchers, leaders, faculty members, and undergraduate students at large, research-extensive universities?

DATA AND METHODOLOGY

This study employed a non-experimental research design and utilized both ordinary least-squares (OLS) regression and ordinal regression to examine and test NSSE survey results collected from over 1,500 first-year and senior students at a large, research-extensive university during Spring 2004. Overall, there were 2,012 respondents representing a response rate of 34 percent with a sampling error of ±2 percent. The overall respondents also reflect larger percentages of minority students compared to the overall population of first-year and senior students due to intentional over-sampling of minority students. The sample and respondent characteristics are provided in Table 1.

The NSSE survey questionnaire itself has been carefully designed and constructed. The instrument's conceptual framework and psychometric properties exhibit strong validity and reliability based on both statistical tests in addition to input and feed back from various experts and students (Kuh, 2003; Pike and Kuh, 2005). These results meet or exceed established standards for reliability and validity. In addition, the questionnaire is designed to minimize factors that are to known to adversely affect the validity of responses, especially in light of potential challenges associated with self-reports by students (Pike 1993, 1995, 1996, 1999).

In order to explore multiple and distinct dimensions of institutional impact and academic quality, four models – two employing OLS regression and two employing ordinal regression – were developed. For all four models, the same independent variables were included based on Chickering and Gamson's (1987, 1991) "Seven Principles for Good Practice in Undergraduate Education" as a conceptual and theoretical guide to enhance model parsimony and completeness. These principles were developed based on

a review of over 50 years of research and maintain strong influence in the practice and study of undergraduate education.

Next, appropriate indicators of the various dimensions of institutional impact and academic quality were identified. In order to gauge institutional contribution to student learning and development, principle components analysis with varimax rotation was used to identify the structure of the institutional contribution/outcome items in the NSSE survey. The results indicated two distinct factors: one centered on academic skills and one centered on personal values and attitudes (the items that comprise each factor are listed in Table 3). NSSE items with a factor loading of .6 or higher were included in each factor and factor scores were calculated for each respondent. These two factors, labeled LRNGAIN and DEVELOP, were used respectively as the dependent variables for the two OLS models. The third and fourth models sought to examine relationships between the same set of independent variables and proxy indicators of student satisfaction: the likelihood a student would return to the same institution if starting over (SAMECOLL) and a rating of the overall quality of the educational experience (ENITEEXP). Due to the ordinal nature of the responses to these items, ordinal regression was employed for these models. All four models were estimated using SPSS 12.0 for Windows.

Recognizing the impact that particular and generally immutable characteristics of students and their backgrounds can have on their college experience and the impact of that experience (Astin, 1993; Bean, 1980; Braxton, 2000; Pascarella and Terenzini, 1991; Tinto, 1975 and 1993) each model controlled for academic preparation/background using ACT and SAT-converted test scores (Marco, G.L., Abdel-fattah, A.A., and Baron, P.A., 1992), gender, minority status, full-time/part-time enrollment status, class rank, place of

residence, whether or not the student started college at the current institution or transferred from another post-secondary institution, and self-reports of the majority of grades earned in classes. All of the variables used in each of the four models, including their respective question item prompts and coding, are listed in Table 2.

Table 1. Sample Characteristics and Response Rate

(percentages within each category)

	FY	ALL	SR
Response Rate[a]			
Overall		34%	
By Class	36%		32%
NSSE Sample Size[b]	2,426		3,537
Sample Error[c]			
Overall		2.0%	
By Class	3.0%		2.7%
Number of Respondents[b]	882		1,139
Total Population	6,003		10,597
Student Characteristics[d]			
Mode of Completion			
Paper	0%		0%
Web	100%		100%
Gender			
Female	60%		58%
Male	40%		42%
Race/Ethnicity			
African American/Black	15%		13%
Am. Indian/Native American	1%		1%
Asian Am./Pacific Islander	13%		27%
Caucasian/White	60%		48%
Hispanic or Latino	3%		4%
Other	0%		1%
Multi-racial	8%		7%
International/Foreign National	7%		17%
Class Level	44%		56%
Enrollment Status			
Full Time	99%		90%
Part Time	1%		10%
Place of Residence			
On-campus	86%		8%
Off-campus	14%		92%
Transfer Status			
Transfer Students	6%		33%
Age			
Non-Traditional (24 or older)	0%		23%
Traditional (less than 24)	100%		77%

Source: NSSE Institutional Respondent Characteristics Report, 2004.

TABLE 2. Independent, Dependent, and Control Variables

In your experience at your institution during the current school year, about how often have you done each of the following? 1=never, 2=sometimes, 3=often, 4=very often

INDEPENDENT VARIABLES	VARIABLE NAMES
1.Asked questions in class or contributed to class discussions	CLQUEST
2.Made a class presentation	CLSPRESEN
3.Prepared two or more drafts of a paper or assignment before turning it in	REWROPAP
4.Worked on a paper or project that required integrating ideas or information from various sources	INTEGRAT
5.Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments	DIVCLASS
6. Worked with other students on projects during class	CLASSGRP
7. Worked with classmates outside of class to prepare class assignments	OCCGRP
8.Put together ideas or concepts from different courses when completing class assignments or during class discussions	INTIDEAS
9.Tutored or taught other students (paid or voluntary)	TUTOR
10.Participated in a community-based project as part of a regular course	COMMPROJ
11.Used an electronic medium (list-serve, chat group, Internet, etc.) to discuss or complete an assignment	ITACADEM
12.Used e-mail to communicate with an instructor	EMAIL
13.Discussed grades or assignments with an instructor	FACGRADE
14.Talked about career plans with a faculty member or advisor	FACPLANS
15.Discussed ideas from your readings or classes with faculty members outside of class	FACIDEAS
16.Received prompt feedback from faculty on your academic performance (written or oral)	FACFEED
17.Worked harder than you thought you could to meet an instructor's standards or expectations	WORKHARD
18.Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)	FACOTHER
19.Discussed ideas from your readings or classes with others outside of class (students, family members, coworkers, etc.)	OOCIDEAS
20.Had serious conversations with students of a different race or ethnicity than your own	DIVSTUD
21.Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values	DIFFSTU2

During the current school year, how much has your coursework emphasized the following mental activities? 1=very little, 2=some, 3=quite a bit, 4=very much

22.**Analyzing** the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components	ANALYZE
23.**Synthesizing** and organizing ideas, information, or experiences into new, more complex interpretations and relationships	SYNTHESZ
24.**Making judgments** about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions	EVALUATE
25.**Applying** theories or concepts to practical problems or in new Situations	APPLYING

(Table 2 continued)

1=very little to 7=very much

INDEPENDENT VARIABLES	VARIABLE NAMES
26.To what extent have your examinations during the current school year challenged you to do your best work?	EXAMS

During the current school year, about how much reading and writing have you done?
1=none, 2=between 1 and 4, 3=between 5 and 10, 4=between 11 and 20, 5=more than 20

27.Number of assigned textbooks, books, or book-length packs of course readings	READASGN
28.Number of written papers or reports of **20 pages or more**	WRITEMOR
29.Number of written papers or reports **between 5 and 19 pages**	WRITEMID
30.Number of written papers or reports of **fewer than 5 pages**	WRITESML

In a typical week, how many homework problem sets do you complete?
1=none, 2=1-2, 3=3-4, 4=5-6, 5=more than 6

31.Number of *problem sets* that take you more than an hour to complete	PROBSETA
32.Number of *problem sets* that take you less than an hour to complete	PROBSETB

Which of the following have you done or do you plan to do before you graduate from your institution?
Recoded: 1= do not plan to do, 2=have not decided, 3=plan to do, 4=done

33.Practicum, internship, field experience, co-op experience, or clinical assignment	INTERN
34.Participate in a learning community or some other formal program where groups of students take two or more classes together	LEANRCOM
35.Work on a research project with a faculty member outside of course or program requirements	RESEARCH
36. Study abroad	STUDYABR
37.Independent study or self-designed major	INDSTUDY
38.Culminating senior experience (comprehensive exam, capstone course, thesis, project, etc.)	SENIORX

About how many hours do you spend in a typical 7-day week doing each of the following?
1=0 hrs/wk, 2=1-5 hrs/wk, 3=6-10 hrs/wk, 4=11-15 hrs/wk, 5=16-20 hrs/wk, 6=21-25 hrs/wk, 7=26-30 hrs/wk, 8=more than 30 hrs/wk

39.Preparing for class	ACADPR01
40.Participating in co-curricular activities	COCURR01

To what extent does your institution emphasize each of the following?
1=very little, 2=some, 3=quite a bit, 4=very much

41.Spending significant amounts of time studying and on academic work	ENVSCHOL

(Table 2 continued)

CONTROL VARIABLES	VARIABLES NAMES
42.Did you begin college at your current institution or elsewhere? (dummy-coded)	ENTER
43Thinking about this current academic term, how would you characterize your enrollment? (dummy-coded: full-time/part-time)	ENRLMENT
44.What have most of your grades been up to now at this institution? (1 = C- or lower…8 = A)	GRADES04
45.Which of the following best describes where you are living now while attending college? (Recoded: 1 = On campus 2 = Off campus within walking 3 = Off campus within driving distance)	LIVENOW
46. Gender (dummy-coded)	GENDER
47. Class Rank (dummy-coded: first year/senior)	CLASSRAN
48. Academic preparation (ACT or SAT-converted score)	ACTSAT
49. Minority status (dummy-coded white/non-white)	MINORITY
DEPENDENT VARIABLES/FACTORS	
50.Learning factor score*	LRNGAIN
51.Development factor score**	DEVELOP
52.If you could start over again, would you go to the *same institution* you are now attending? (1= Definitely no, 2 = Probably no, 3 = Probably yes, 4 = Definitely yes)	SAMECOLL
53.How would you evaluate your entire educational experience at this institution? (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent)	ENTIREEXP

*LRNGAIN factor items: acquired broad general education, writing skills, speaking skills, critical thinking skills, quantitative analysis skills, IT skills, team skills

**DEVELOP factor items: learning on my own, understanding myself, understanding other races/ethnicities, personal values/ethics, contributing to community, deeper sense of my spirituality

RESULTS

The following tables present the statistical results from the four models. Table 3 provides summary statistics including adjusted/pseudo R^2, F/χ^2 statistics, model significance, and sample sizes (n). Tables 4, 5, 6, and 7 provide the regression output for LRNGAIN, DEVELOP, SAMECOLL, and ENTIREXP respectively. These results include parameter estimates/variable coefficients and confidence intervals for the control variables and independent variables of interest. Regression diagnostics for the OLS models did not suggest problems with collinearity among the independent variables or the distribution of residuals (Gujarati, 1995).

Table 3. Model Summaries

Model	Adjusted/Pseudo R^2*	F/χ^2**	Significance	n
LRNGAIN	.389	22.642	.000	1,528
DEVELOP	.228	11.061	.000	1,529
SAMECOLL	.145*	240.756**	.000	1,532
ENTIREEXP	.232*	405.257**	.000	1,533

Table 4. LRNGAIN Model Results

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3.961	.327		-12.121	.000		
	enter	-.054	.075	-.015	-.718	.473	.939	1.065
	enrlment	-.005	.103	-.001	-.046	.963	.877	1.141
	grades04*	.028	.014	.048	2.051	.040	.739	1.354
	livenow	-.021	.035	-.018	-.611	.541	.473	2.116
	gender	-.062	.045	-.031	-1.386	.166	.818	1.222
	classran**	.063	.021	.096	3.056	.002	.406	2.463
	minority	.003	.043	.001	.062	.951	.865	1.156
	actsat	.000	.000	-.030	-1.212	.226	.664	1.507
	email**	.088	.032	.073	2.775	.006	.578	1.729
	facgrade	-.012	.030	-.011	-.392	.695	.548	1.824
	facplans	.016	.027	.015	.589	.556	.642	1.559
	facideas	-.004	.031	-.003	-.136	.891	.612	1.633
	facother	.039	.029	.034	1.354	.176	.639	1.565
	research	-.027	.023	-.028	-1.167	.243	.712	1.405
	divclass	.038	.024	.036	1.560	.119	.744	1.344
	classgrp	.035	.025	.031	1.404	.161	.820	1.220
	occgrp***	.098	.025	.092	3.898	.000	.714	1.400
	tutor	-.002	.026	-.002	-.079	.937	.750	1.334
	oocideas*	.061	.026	.056	2.339	.019	.689	1.451
	divrstud	-.015	.030	-.015	-.492	.623	.433	2.307
	diffstu2	-.027	.030	-.027	-.887	.375	.442	2.261
	learncom	.022	.019	.025	1.152	.249	.841	1.189
	clquest	.020	.028	.017	.694	.488	.652	1.534
	clpresen	.016	.027	.014	.583	.560	.659	1.517
	commproj	-.037	.027	-.032	-1.370	.171	.756	1.324
	itacadem*	.049	.021	.052	2.303	.021	.795	1.258
	intern	.010	.026	.009	.405	.686	.853	1.172
	studyabr	.020	.021	.020	.938	.348	.857	1.167
	indstudy	-.003	.023	-.003	-.143	.887	.836	1.196
	seniorx*	.047	.023	.045	2.038	.042	.816	1.225
	facfeed***	.107	.027	.093	3.887	.000	.706	1.417
	envschol***	.288	.027	.235	10.580	.000	.808	1.238
	workhard	.005	.028	.005	.191	.849	.642	1.558
	memorize	-.021	.024	-.018	-.871	.384	.900	1.111
	analyze	.047	.034	.036	1.379	.168	.580	1.725
	synthesz***	.105	.031	.092	3.350	.001	.528	1.894
	evaluate**	.080	.029	.074	2.782	.005	.565	1.771
	applying***	.142	.030	.123	4.719	.000	.587	1.705
	exams***	.105	.019	.125	5.437	.000	.751	1.331
	readasgn	.019	.022	.019	.866	.387	.833	1.200
	writemor	-.012	.037	-.007	-.315	.753	.785	1.275
	writemid	.015	.026	.014	.574	.566	.701	1.426
	writesml	.001	.021	.001	.050	.960	.777	1.286
	probseta	-.029	.020	-.033	-1.431	.153	.767	1.304
	probsetb	.032	.019	.038	1.689	.091	.808	1.238

Table 5. DEVELOP Model Results

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-2.179	.365		-5.963	.000		
	enter	.000	.084	.000	.005	.996	.939	1.065
	enrlment	.073	.115	.015	.634	.526	.876	1.142
	grades04**	.043	.015	.073	2.799	.005	.742	1.348
	livenow***	-.136	.039	-.115	-3.513	.000	.473	2.114
	gender	-.020	.050	-.010	-.397	.692	.821	1.219
	classran	.011	.023	.017	.494	.621	.405	2.466
	minority	.080	.048	.040	1.676	.094	.866	1.155
	actsat**	.000	.000	-.073	-2.657	.008	.665	1.504
	email*	.075	.035	.062	2.107	.035	.577	1.732
	facgrade**	-.103	.033	-.094	-3.107	.002	.547	1.828
	facplans	.052	.030	.048	1.708	.088	.640	1.563
	facideas	.060	.035	.050	1.726	.085	.612	1.635
	facother*	.080	.032	.069	2.458	.014	.638	1.566
	research	-.031	.026	-.031	-1.164	.244	.709	1.410
	divclass***	.112	.027	.107	4.123	.000	.746	1.340
	classgrp	-.028	.028	-.025	-1.005	.315	.818	1.222
	occgrp	-.029	.028	-.027	-1.020	.308	.714	1.401
	tutor	.054	.029	.048	1.852	.064	.752	1.330
	oocideas	.003	.029	.003	.110	.912	.689	1.451
	divrstud	.006	.033	.006	.171	.864	.434	2.305
	diffstu2***	.110	.034	.109	3.227	.001	.443	2.259
	learncom	.039	.022	.044	1.784	.075	.842	1.188
	clquest	-.042	.032	-.037	-1.346	.179	.652	1.533
	clpresen	-.003	.031	-.003	-.093	.926	.657	1.521
	commproj**	.081	.030	.069	2.656	.008	.756	1.323
	itacadem	.030	.024	.032	1.271	.204	.792	1.262
	intern	.024	.029	.020	.829	.407	.852	1.173
	studyabr*	.055	.024	.057	2.331	.020	.857	1.167
	indstudy	-.003	.026	-.003	-.115	.908	.835	1.198
	seniorx	.040	.026	.038	1.543	.123	.816	1.226
	facfeed**	.090	.031	.078	2.921	.004	.705	1.418
	envschol***	.100	.030	.082	3.295	.001	.808	1.237
	workhard	.033	.031	.030	1.081	.280	.642	1.556
	memorize	.024	.026	.022	.913	.361	.901	1.110
	analyze	-.063	.038	-.049	-1.649	.099	.583	1.716
	synthesz*	.071	.035	.063	2.049	.041	.530	1.888
	evaluate	.101	.032	.094	3.136	.002	.565	1.771
	applying	.049	.034	.043	1.459	.145	.586	1.705
	exams*	.047	.022	.056	2.179	.029	.752	1.330
	readasgn	.038	.025	.037	1.517	.129	.833	1.201
	writemor	-.036	.041	-.022	-.869	.385	.786	1.272
	writemid	-.012	.029	-.011	-.423	.673	.702	1.424
	writesml	-.036	.024	-.038	-1.503	.133	.778	1.285
	probseta*	-.057	.023	-.065	-2.510	.012	.764	1.308
	probsetb	.017	.021	.021	.823	.410	.804	1.244

Table 6. SAMECOLL Model Results

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[samecoll = 1]	.589	.810	.529	1	.467	-.998	2.176
	[samecoll = 2]	2.217	.806	7.557	1	.006	.636	3.797
	[samecoll = 3]	4.203	.812	26.759	1	.000	2.610	5.795
Location	enter	-.225	.185	1.482	1	.224	-.587	.137
	enrlment	.307	.252	1.483	1	.223	-.187	.801
	grades04	.049	.034	2.036	1	.154	-.018	.116
	livenow*	-.196	.086	5.234	1	.022	-.365	-.028
	gender	.055	.113	.238	1	.625	-.166	.275
	classran	-.061	.052	1.398	1	.237	-.163	.040
	minority**	-.316	.108	8.624	1	.003	-.527	-.105
	actsat*	.001	.000	5.214	1	.022	.000	.002
	email*	-.187	.080	5.515	1	.019	-.343	-.031
	facgrade	-.005	.075	.004	1	.950	-.151	.141
	facplans	.060	.069	.767	1	.381	-.074	.194
	facideas	-.095	.078	1.474	1	.225	-.249	.058
	facother	.046	.074	.382	1	.536	-.099	.190
	research	-.043	.059	.537	1	.464	-.159	.072
	divclass	.074	.061	1.474	1	.225	-.046	.194
	classgrp	-.090	.063	2.074	1	.150	-.213	.033
	occgrp	.120	.064	3.534	1	.060	-.005	.244
	tutor*	.146	.066	4.836	1	.028	.016	.275
	oocideas	.069	.066	1.105	1	.293	-.060	.197
	divrstud	.012	.074	.025	1	.875	-.134	.158
	diffstu2	.068	.076	.806	1	.369	-.081	.218
	learncom	-.062	.049	1.614	1	.204	-.158	.034
	clquest	-.055	.071	.595	1	.440	-.195	.085
	clpresen	.071	.069	1.053	1	.305	-.065	.207
	commproj	.060	.069	.747	1	.387	-.075	.194
	itacadem**	.157	.053	8.737	1	.003	.053	.262
	intern	-.059	.064	.847	1	.357	-.185	.067
	studyabr	-.024	.053	.214	1	.644	-.128	.079
	indstudy	-.039	.058	.438	1	.508	-.153	.076
	seniorx*	.128	.058	4.838	1	.028	.014	.241
	facfeed**	.201	.069	8.352	1	.004	.065	.337
	envschol**	.216	.068	10.030	1	.002	.082	.350
	workhard***	-.248	.070	12.388	1	.000	-.385	-.110
	memorize*	-.119	.060	3.994	1	.046	-.237	-.002
	analyze	-.009	.085	.011	1	.916	-.175	.157
	synthesz	.029	.078	.142	1	.706	-.124	.183
	evaluate	.065	.073	.780	1	.377	-.079	.208
	applying	.113	.075	2.287	1	.130	-.034	.261
	exams***	.344	.049	50.288	1	.000	.249	.440
	readasgn	-.055	.056	.947	1	.331	-.165	.056
	writemor	.004	.093	.002	1	.962	-.178	.187
	writemid	.015	.066	.054	1	.816	-.115	.146
	writesml	-.033	.054	.378	1	.539	-.139	.073
	probseta**	-.131	.051	6.592	1	.010	-.231	-.031
	probsetb	.079	.047	2.772	1	.096	-.014	.171

Table 7. ENTIREEXP Model Results

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[entirexp = 1]	3.328	.853	15.216	1	.000	1.656	5.000
	[entirexp = 2]	5.641	.852	43.865	1	.000	3.972	7.311
	[entirexp = 3]	8.712	.873	99.645	1	.000	7.002	10.423
Location	enter	.059	.193	.094	1	.759	-.319	.437
	enrlment	.503	.264	3.634	1	.057	-.014	1.020
	grades04***	.193	.036	29.244	1	.000	.123	.263
	livenow	-.057	.089	.416	1	.519	-.232	.117
	gender	-.070	.115	.367	1	.545	-.296	.156
	classran*	-.110	.054	4.218	1	.040	-.215	-.005
	minority*	-.247	.111	4.959	1	.026	-.463	-.030
	actsat*	.001	.000	3.840	1	.050	.000	.002
	email	-.049	.082	.356	1	.551	-.209	.111
	facgrade	-.059	.076	.604	1	.437	-.209	.090
	facplans*	.179	.070	6.452	1	.011	.041	.316
	facideas	-.011	.080	.020	1	.889	-.169	.146
	facother	-.022	.075	.083	1	.773	-.169	.126
	research	-.052	.061	.746	1	.388	-.171	.066
	divclass	.118	.063	3.565	1	.059	-.005	.241
	classgrp	-.095	.064	2.175	1	.140	-.220	.031
	occgrp	.058	.065	.788	1	.375	-.070	.186
	tutor	-.009	.067	.019	1	.890	-.141	.122
	oocideas***	.215	.067	10.206	1	.001	.083	.347
	divrstud	.095	.077	1.537	1	.215	-.055	.245
	diffstu2	-.073	.079	.856	1	.355	-.227	.081
	learncom	-.091	.050	3.285	1	.070	-.190	.007
	clquest	.028	.073	.150	1	.698	-.115	.171
	clpresen	.113	.071	2.520	1	.112	-.027	.253
	commproj	-.020	.070	.079	1	.779	-.157	.117
	itacadem	.082	.055	2.226	1	.136	-.026	.189
	intern	.014	.067	.045	1	.832	-.116	.145
	studyabr	.048	.054	.761	1	.383	-.059	.154
	indstudy	-.025	.060	.176	1	.675	-.143	.093
	seniorx**	.156	.060	6.772	1	.009	.038	.273
	facfeed***	.348	.072	23.553	1	.000	.207	.488
	envschol***	.357	.071	25.429	1	.000	.218	.495
	workhard*	-.171	.072	5.653	1	.017	-.311	-.030
	memorize***	-.239	.061	15.106	1	.000	-.359	-.118
	analyze	.021	.087	.058	1	.810	-.150	.192
	synthesz	.073	.081	.819	1	.365	-.085	.231
	evaluate	-.006	.075	.006	1	.939	-.152	.141
	applying*	.180	.078	5.367	1	.021	.028	.332
	exams***	.366	.050	52.673	1	.000	.267	.465
	readasgn	.032	.058	.297	1	.585	-.082	.145
	writemor	.005	.096	.003	1	.956	-.182	.193
	writemid	.036	.068	.277	1	.599	-.097	.169
	writesml	-.037	.055	.453	1	.501	-.146	.071
	probseta	-.096	.052	3.390	1	.066	-.199	.006
	probsetb	.062	.048	1.648	1	.199	-.033	.157

DISCUSSION AND IMPLICATIONS

There are a number of interesting and significant findings that emerge from the regression results. With notable consistency and significance across all four models, the extent to which exams challenge students to do their best work, institutional emphasis on academics and studying, and the frequency of prompt feedback on academic performance had a positive relationship to LRNGAIN, DEVELOP, SAMECOLL, and ENTIREEXP. These results appear to support the view that efforts to increase institutional impact on student learning and development and increasing student satisfaction do not work at cross purposes. In fact, these two "competing" strategic views of how best to enhance academic quality, institutional, and persistence actually appear to be supported by and related to the same set of institutional foci and practices. These findings may suggest some interesting implications for enhancing the communication and level of expectations to students, exploring the motivation and aspirations of students who attend, and improving methods to gauge and reward instructional quality based on the level of academic challenge and the quality of faculty feedback to students. However, the apparent negative relationship between the amount of short homework assignments (PROBSETA) and DEVELOP and SAMECOLL also suggests that programs and courses that employ such an approach to student preparation and evaluation may benefit from exploring a more diverse set of course experiences and requirements (i.e. application-focused assignments, problems and projects; small study groups; integrated technology) as suggested by other findings in this study.

These results are supported further by the apparent role of emphasis on higher-order critical thinking skills in courses. The relationship is most prominent in the

LRNGAIN model where synthesis (SYNTHESZ) and application (APPLYING) are significant at the .001 level and making judgments (EVALUATE) was significant at the .01 level. SYNTHESZ also was significant in the DEVELOP model. In a complementary fashion, course emphasis on "memorization to repeat information back in the same form" (MEMORIZE) had a negative relationship with SAMECOLL and ENTIREEXP.

In addition -- and contrary to what one might expect -- peer interactions (OCCGRP) and conversations about course ideas and readings with family and others (OCCIDEAS) appear to have a stronger relationship with LRNGAIN in comparison to faculty member/instructor interactions and faculty/instructor interactions appear to be more strongly related to DEVELOP. Strong peer interactions within the context of classroom learning and strong faculty interactions outside of the classroom may productively challenge students' initial expectations of faculty and peer roles in and out of the classroom. In fact, serving as a tutor for peers (TUTOR) – another form of peer interaction -- also had a positive relationship with SAMECOLL. In other words, creating a quality undergraduate education is a collective responsibility and this includes students' responsibility to their peers in classroom and class-related settings and faculty members' responsibility to students outside of the classroom. However, the results also suggest that interaction between students and faculty may be most productive when it is regular, prompt, and focused on academic performance (FEEDBACK). This finding is supported by Kuh and Hu (2001b).

The interesting relationship between academic preparation and the dependent variables in all four models also is worth noting. Specifically, the level of academic

preparation as measured by ACTSAT had an insignificant relationship with LRNGAIN, a negative relationship with DEVELOP, and a positive relationship with SAMECOLL and ENTIREEXP. These findings may suggest that students who enter college with higher levels of academic preparation – given their relatively higher "starting point"– may not experience as much change during their college years even as they are more likely to be satisfied with their experience and persist. This finding is especially important to keep in mind when and where institutions or policymakers pursue "value added" approaches to institutional effectiveness. It is likely that more selective institutions (institutions with better-prepared students) may not appear to be as effective on the basis of such an approach. Even so, it does not appear that academic preparation or selectivity is the most important indicator of institutional impact or satisfaction across the various quality dimensions represented by these four models.

Specific elements of academic and institutional programming and the curriculum also appeared to have a positive and significant relationship with various dimensions of institutional impact and student satisfaction as well. In particular, the use of technology in courses (ITACADEM) had a positive and significant relationship with LRNGAIN and SAMECOLL. This result lends additional support to recent findings by Nelson-Laird (2005) and suggests that investments in technological infrastructure and training are a productive use of resources (Ryan, 2004 and 2005; Smart, Ethington, Riggs, and Thompson, 2002; Toutkoushian and Smart, 2001). At the same time, there was a negative and significant relationship between using e-mail to communicate with an instructor (EMAIL) and SAMECOLL. The reasons for using e-mail, subject matter, and preferences of the student and instructor may be key determinants behind this

relationship. Students that prefer personal communication and do not feel they have that opportunity, the use of e-mail as a way to raise problems or difficult issues face-to-face, and the effects of e-mail as a mode of communication that confirms expectations of a large, impersonal environment and contributes to social isolation represent some possible explanations.

Additional opportunities or embedded requirements to complete a culminating senior experience (SENIORX) and study abroad experiences (STUDYABR) also had positive and significant relationships with LRNGAIN, SAMECOLL, and ENTIREEXP and with DEVELOP respectively. The benefits of service learning (Jones, 2003a, 2003b, 2004) were supported as well. When considered in tandem with the potential benefits of student-faculty discussions about career plans (FACPLANS) and student conversations with peers with different beliefs, opinions, and values in and out of class (DIFFSTU2 and DIVCLASS), attempts to link theory or concepts learned in class with their role and application in "real" settings with others who have different perspectives and experiences appear to play important roles and warrant serious consideration by institutional leaders in their planning and programming decisions. These results also support the role that out of class experiences and their positive relationship with desired outcomes (Kuh, 1995).

Contrary to what accrediting agencies typically suggest (Higher Learning Commission, 2004), grades may serve as a valid proxy indicator of academic quality and impact and can play a meaningful role in fostering student outcomes assessment within the institutional culture (Palomba and Banta, 1999; Walvoord, 2004). Given the long-standing practice of grading as a means of documenting and communicating achievement in a course, engaging faculty and constituents who seek to enhance accountability around

defining and "unpacking" the meaning of grades may provide a starting point for discussing course and program improvement.

The models also produced what appear to be contradictory and unexpected results. EXAMS and WORKHARD exhibited opposing relationships in both the SAMECOLL and ENTIREXP models. What might explain this apparent contradiction and distinction between being challenged to do one's best and working harder than one thought was possible to meet an instructor's expectations? This result may reflect the prior academic experience of students, particularly in high school. For many years, the Higher Education Research Institute (HERI) Freshman Survey results has suggested a trend of higher reported grades and low reported effort to achieve those grades among college freshmen from across the United States (HERI, 2003). Students who come from backgrounds with a combination of low effort and high grade performance may have a more difficult time making the transition to college and adjusting to the higher amount of effort required for similar levels of grade performance.

Another unexpected result centers on the insignificant relationship between research experiences in all four models. One might expect such experiences to play an important role given its place and strength at research-extensive universities. It is possible that such experiences may be captured by responses to SENIORX and FACOTHER. However, it also may reflect the need to give more attention and improved coordination to enhance the role of research experiences in undergraduate education and work to challenge the view that research and undergraduate instruction represent competing agendas in a zero-sum game.

Among the remaining control variables, MINORITY was insignificant in the LRNGAIN and DEVELOP models. However, it exhibited a negative relationship with SAMECOLL and ENTIREEXP. This suggests that more work needs to be done not only to seek fair levels of diversity and representation but also to enhance the supportive and welcoming aspects of the institutional environment that improve minority students' overall experience once they matriculate. This is particularly important given the remaining gap in degree attainment between minority and non-minority students, the particular challenges to degree attainment for African-American males (American Council for Education, 2003), and the strong, positive relationship between DIFFSTU2 and DEVELOP suggested by the results in this study. The impact of diversity and access policies and the quality of the educational experience on the representation of students from different backgrounds in the post-9/11 and post-Grutter v. Bollinger era will need to be watched very closely if both equal treatment (access) and the affective development of students are to maintain their status as principles of an effective post-secondary educational system.

Living off-campus also had a negative relationship with DEVELOP. Those who live on or at least closer to campus may benefit more from access to and involvement with the campus community. Students who live away from campus also may be more likely to experience other pressures or responsibilities such as more hours per week in a paid position and dependent care. Campus housing options that accommodate different living/family needs, services that minimize the impact of transportation and dependent care, and programs tailored to enhance "quality time" with the institution may require increased attention and creative thinking on the part of institutions and policymakers.

LIMITATIONS

Although this study points to a set of interesting findings, especially for large, research-extensive institutions, there are some limitations to consider.

First, this study was conducted based on a single institution at a single point in time. Other studies of large institutions and research-extensive institutions (and institutions of other types) will be required to continue down the path of determining whether or not particular forms of engagement and best practices and their relationships to various institutional and student outcomes differ across institution types. Also, the NSSE survey is administered in the spring; at that point in the academic year, there is some number of students (notably first-year students) who have already left the institution and taken a potentially important and distinct source of information along with them. Future attempts to explore these missing cases might be a fruitful line of inquiry.

In addition, there can be differences between respondents and non-respondents (Porter and Whitcomb, 2005). In this study, students who participated and had complete data were more likely to be white, female, live on campus, non-transfers, and enrolled full-time (based on chi-square and Mann-Whitney tests of mean rank differences).

Another limitation involves the role of student personality (Dollinger, 2000), motivation, and other background and institutional variables that may lead to omitted-variable bias in the models. Although variables selection was guided by theory and prior research, the integration of additional components found within psychological, social, institutional, and economic models could enhance the explanatory power of "institutional impact" models such as those used in this study. Efforts to integrate key components of

different perspectives into a more unified model may help to unite various research programs and agendas while providing a richer context for examining a complex process. Here, mixed methods approaches may help to connect model components and explore casual and temporal links within a more unified "quality" or "institutional impact" model of undergraduate education (Cabrera and Castenada, 1993). These models also might include components of research productivity and outreach to further integrate and better identify leverage and sticking points across various outcome and mission areas.

Lastly, it is important to consider unique aspects of the institutional context. The institution used as the focus for this study has pursued and realized an increasing educational profile among its undergraduate students. Entering freshman class ACT averages have increased steadily and considerably in recent years. It is possible that this trend and dynamic may play a role in explaining the positive relationship between academic challenge and institutional emphasis on academics with LRNGAIN, DEVELOP, SAMECOLL, and ENTIREEXP. The institution may need to adjust its expectations and identity to "catch up" with the changing needs and expectations of the students they teach and mentor.

CONCLUSION

To summarize these findings within the context of the Chickering and Gamson framework and the main research questions, the overall results suggest that high expectations and prompt feedback on academic performance may provide the most fruitful avenues for improving undergraduate education outcomes at large, research-extensive universities. Specific elements and kinds of engagement may "matter" more than others and specific engagement items may hold their place of importance across a

range of institutional and student outcomes of interest, suggesting a certain link between best practices that enhance learning and development and best practices that enhance student satisfaction, retention, and perceptions of the quality of their overall educational experience. However, it is clear that specific kinds of contact with peers and faculty and enriching educational experiences (or diverse learning opportunities) play an important role as well.

Also, student academic preparation -- although significant in three of the four models -- does not appear to be the most important factor when institutional practices and student experiences are taken into account. What happens to students and what students do during their collegiate experience appears to matter even more. As a result, institutional initiatives and public policies that seek to enhance instruction and learning via specific educational experiences and thoughtful integration of technology (Barr and Tagg, 1995; Guskin, 1994a and 1994b; Twigg, 2003) – with the funding to create and sustain them – may be productive ways to channel valuable resources.

For institutions with complex missions and large scale operations in instruction, research, and public service, the application of sound theory and empirical methods of inquiry to shape priorities and identify key leverage points to improve undergraduate education represents an approach that brings well-established principles of scholarship and the benefit of research to bear on the critical challenge of improving undergraduate education. Further inquiry and study focused on individual institutions by both researchers and leaders along the lines suggested by this study appears warranted.

References

American Council for Education (2003). Gender Equity in Higher Education: Are Male Students at a Disadvantage? Report by ACE Center for Policy Analysis. Source: http://www.acenet.edu/bookstore/pdf/2003_gender_equity_update.pdf

Astin, Alexander W. (1993). *What Matters In College: Four Critical Years Revisited*. San Francisco: Jossey-Bass.

Barr, Robert B. and Tagg, John (1995). From teaching to learning: A new paradigm for undergraduate education. *Change* November/December.

Bean, J.P. (1980) Dropouts and turnover: The synthesis and test of a causal model of student attrition. *Research in Higher Education* 12: 155-187.

Braxton, J.M. (2000). *Reworking the Student Departure Puzzle* (1st ed.). Vanderbilt University Press, Nashville, TN.

Cabrera, A.F. and Castenada, M.B. (1993). The convergence between two theories of college persistence. *Journal of Higher Education* 63: 143-164.

Chickering, A.W., and Gamson, Z.F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin* 37(7): 3-7.

Chickering, A.W., and Gamson, Z.F. (1991). Applying the Seven Principles for Good Practice in Undergraduate Education. *New Directions for Teaching and Learning*. San Francisco: Jossey-Bass Inc.

Dollinger, Stephen J. (2000). Locus of control and incidental learning: an application to college student success. *College Student Journal* 34(4): 537-540.

Gujarati, Damodar N. (1995). Basic Econometrics (3rd Ed.). McGraw-Hill, New York.

Guskin, A. E. (1994a). Reducing student costs and enhancing student learning: The university challenge of the 90's-Part I: Restructuring the role of faculty. *Change* 26(4): 22-29.

Guskin, A. E. (1994b). Reducing student costs and enhancing student learning: The university challenge of the 90's-Part II: Restructuring the role of faculty. *Change* 26(5): 16-25.

Higher Education Research Institute (2003). The American Freshman: National Norms for Fall 2003. Los Angeles, CA.

Higher Learning Commission (2004). *Handbook of Accreditation* (3rd ed.). Chicago, IL.

Jones, S. R., & Abes, E. S. (2003). Developing student understanding of HIV/AIDS through community service-learning: A case study analysis. *Journal of College Student Development* 44: 470-488.

Jones, S. R., & Hill, K. E. (2003). Understanding patterns of commitment: Student motivation for community service involvement. *Journal of Higher Education* 74: 516-539.

Jones, S. R., & Abes, E. S. (2004). Enduring influences of service-learning on college student's identity development. *Journal of College Student Development* 45: 149-166.

Kuh, G.D. (1995). The other curriculum: Out of class experiences associated with student learning and development. *Journal of Higher Education* 66(2): 123-155.

Kuh, G.D. (2001). College students today: why we can't leave serendipity to chance. In: Altbach, P., Gumport, P., and Johnstone, B. (eds.). *In Defense of the American University*. Johns Hopkins University Press, Baltimore, 277-303.

Kuh, G.D. (2003). The National Survey of Student Engagement: Conceptual framework and Overview of Psychometric Properties. http://www.indiana.edu/~nsse/pdf/conceptual_framework_2003.pdf

Kuh, G.D. and Hu, Shouping (2001a). Learning productivity at research universities. *The Journal of Higher Education* 72 (1): 1-28.

Kuh, G.D. and Hu, Shouping (2001b). The effects of student-faculty interaction in the 1990's. *The Review of Higher Education* 24: 309-332.

Marco, G.L., Abdel-fattah, A.A., and Baron, P.A. (1992). Methods used to establish score comparability on the enhanced ACT assessment and the SAT (College Board Report No. 92-3). New York, NY: The College Board.

National Survey of Student Engagement (2001). *NSSE Technical and Norms Report*. Indiana University Center for Postsecondary Research and Planning.

Nelson-Laird, Thomas (2004). Student experiences with information technology and their relationship to other aspects of student engagement. *Research in Higher Education* 46(2): 211-233.

Pace, C. R. (1984). *Measuring the quality of college student experiences*. Los Angeles: University of California, Los Angeles, Center for the Study of Evaluation.

Palomba, Catherine A. and Banta, Trudy W. (1999). *Assessment Essentials: Planning, Implementing, and Improving Assessment in Higher Education.* San Francisco: Jossey-Bass Publishers.

Pascarella, Ernest T. and Terenzini, Patrick T. (1991). *How College Affects Students: Findings and Insights From Twenty Years Of Research*. San Francisco: Jossey-Bass.

Pike, G.R. (1993). The relationship between perceived learning and satisfaction with college: An alternative view. *Research in Higher Education* 34: 23-40.

Pike, G.R. (1995). The relationships between self reports of college experiences and achievement test scores. *Research in Higher Education* 36: 1-22.

Pike, G. R. (1996). Limitations of using students' self-reports of academic development as proxies for traditional achievement measures. *Research in Higher Education* 37: 89-114.

Pike, G.R. (1999). The constant error of the halo in educational outcomes research. *Research in Higher Education* 40: 61-86.

Pike, Gary R. (2004). Measuring Quality: A comparison of U.S. News Rankings and NSSE Benchmarks. *Research in Higher Education* 45(2): 193-208.

Pike, G.R. and Kuh, G.D. (2005) A typology of student engagement at American colleges and universities. *Research in Higher Education* 46(2): 189-205.

Pike, Gary R., Kuh, George D., and Gonyea Robert M. (1993). The relationship between institutional mission and students' involvement and educational outcomes. *Research in Higher Education* 44(2): 241-261.

Porter, Stephen R. and Whitcomb, Michael E. (2005). Non-response in student surveys: The role of demographics, engagement and personality. *Research in Higher Education* 46(2): 127-152.

Ryan, John F. (2004). The relationship between institutional expenditures and degree attainment at baccalaureate colleges. *Research in Higher Education* 45(2): 97-114.

Ryan, John F. (2005). Institutional expenditures and student engagement: A role for financial resources in enhancing student learning and development? *Research in Higher Education* 46(2): 235-249.

Smart, John C., Ethington, Corinna A., Riggs, Robert O. and Thompson, Michael D. (2002). Influences of institutional expenditure patterns on the development of students' leadership competencies. *Research in Higher Education* 43(1): 115-132.

Spady, W. (1971). Drop-outs from higher education: toward an empirical model. *Interchange* 1: 38-82.

Tinto, Vincent (1975). Dropout from higher education: a theoretical synthesis of recent research. *Review of Educational Research* 45: 89-125.

Tinto, Vincent (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition*. Chicago: University of Chicago Press.

Toutkoushian, Robert K. and Smart, John C. (2001). Do institutional characteristics affect gains from college? *The Review of Higher Education* 25(1): 39-61.

Twigg, Carol (2003). Improving learning and reducing costs: New models for online learning. *Educause*, September/October: 28-38.

Umbach, Paul D. and Wawrzynski, Matthew R. (2005). Faculty do matter: the role of college faculty in student learning and development. *Research in Higher Education* 46(2): 153-181.

U.S. News and World Report (2002-2005). *America's Best Colleges.*

Walvoord, Barbara (2004). *Assessment Clear and Simple*. San Francisco: Jossey-Bass.