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A TYPOLOGY OF STUDENT ENGAGEMENT FOR AMERICAN COLLEGES AND UNIVERSITIES★

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The Carnegie classification system has served as a framework for research on colleges and universities for more than 30 years. Today, the system's developers are exploring criteria that more effectively differentiate among institutions. One approach being considered is classifying institutions based on students' educational experiences. This study explored whether it is possible to create a typology of institutions based on students' experiences. Results indicated that such a typology could be created, and the types were somewhat independent of institutional mission (i.e., Carnegie classification).

KEY WORDS: student engagement; involvement; Carnegie classification; typology; NSSE; *Q* factor analysis.

INTRODUCTION

Since its development in 1973, the Carnegie classification system has served as a framework for research on colleges and universities. These mission-oriented classifications were revised in 2000 to reflect recent changes in higher education, and the system's developers continue to explore criteria that more effectively differentiate among institutions (McCormick, 2000). One approach being considered is classifying institutions based on students' educational experiences (McCormick, personal communication, May 21, 2003).

Examining students' experiences is important because student engagement in educationally purposeful activities has desirable effects on student

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learning and success during college (Astin, 1977, 1993; Feldman and Newcomb, 1969; Kuh, Pace, and Vesper, 1997; Pace, 1990; Pascarella and Terenzini, 1991). Based on their review of 20 years of research, Pascarella and Terenzini (1991, p. 610) concluded, "one of the most inescapable and unequivocal conclusions we can make is that the impact of college is largely determined by the individual's quality of effort and level of involvement in both academic and non-academic activities."

RELATED LITERATURE

Student-engagement theory had its origin in the work of Astin (1984, 1985), Pace (1984), and Kuh and his colleagues (Kuh, Schuh, Whitt, and Associates, 1991; Kuh, Whitt, and Strange, 1989). Although these writers used different terminology to describe their concepts of student engagement, their views were based on the simple, but powerful, premise that students learn from what they do in college. Research has strongly supported this assumption, indicating that engagement is positively related to objective and subjective measures of gains in general abilities and critical thinking (Endo and Harpel, 1982; Gellin 2003; Kuh, Hu, and Vesper, 2000; Kuh and Vesper, 1997; Pascarella, Duby, Terenzini, and Iverson, 1983; Pascarella et al., 1996; Pike, 1999, 2000; Pike and Killian, 2001; Pike and Kuh, in press; Pike, Kuh, and Gonyea, 2003; Terenzini, Pascarella, and Blimling, 1996). Student engagement is also positively linked to grades (Astin, 1977, 1993; Indiana University Center for Postsecondary Research, 2002; Pike, Schroeder, and Berry, 1997) and persistence rates (Astin, 1985; Pike et al., 1997).

A second important premise of the frameworks of Astin, Kuh, and Pace is that, even though the focus is on *student* engagement, *institutional* policies and practices influence levels of engagement on campus. For example, research has not been able to produce consistent relationships between students' pre-college characteristics (e.g., gender, minority status and entering ability levels) and engagement during college (Bauer and Liang, 2003; Endo and Harpel, 1982; Hu and Kuh, 2002; Indiana University Center for Postsecondary Research, 2002; Iverson, Pascarella, and Terenzini, 1984; Kuh et al., 2000; Pike, 1999, 2000; Pike and Killian, 2001; Pike and Kuh, in press; Pike et al., 2003; Pike et al., 1997). Moreover, the strength of those relationships, when present, was quite low. Studies by Pike and his colleagues have found that students' background characteristics generally account for 1–5% of the variance in levels of engagement (Pike, 1999, 2000; Pike and Killian, 2001; Pike and Kuh, in press, Pike et al., 2003).

The influence of institutional characteristics on student engagement extends well beyond global characteristics such as size and institutional mission. Although both conventional wisdom and research studies suggest that attending small liberal arts colleges is associated with higher levels of engagement (Hu and Kuh, 2002; Kuh, 1981; Kuh and Siegel, 2000; Pascarella, Wolniak, Cruce, and Blaich, 2004), other studies have come to a different conclusion. For example, (Pike et al., 2003) found that differences in levels of engagement across Carnegie classifications disappeared after taking into account the background characteristics of the students. The most important institutional factors are thought to be the policies and practices adopted by institutions to increase student engagement. Several studies have shown that living on campus, as opposed to commuting to college, is positively related to engagement (Chickering, 1975; Pike and Kuh, in press; Terenzini et al., 1996). The gains associated with on-campus living are further enhanced by participating in learning communities, which substantially increases student engagement, self-reported gains in learning, and persistence (Indiana University Center for Postsecondary Research, 2002; Pike, 1999; Pike et al., 1997; Zhao and Kuh, 2004).

A soon-to-be published study of 20 colleges and universities with higher-than-predicted scores on the National Survey of Student Engagement and higher-than-predicted graduation rates suggests that a variety of factors that transcend institutional type contribute to student engagement and related desirable outcomes of college (Kuh, Kinzie, Schuh, Whitt, and Associates, in press). That is, very different types of colleges and universities participated in the Documenting Effective Educational Practices (DEEP) project, ranging from highly selective public and private institutions such as Macalester College, Miami University of Ohio, the University of Michigan, and the University of the South to less selective schools such as Fayetteville State University, University of Maine at Farmington and University of Texas at El Paso. Despite being very different in many ways, all had put in place policies and practices that induced higher levels of student engagement and student success relative to other schools. Moreover, the DEEP schools also shared some general conditions that are not obviously attributable to student background characteristics or institutional structural features reflected by the Carnegie classification. For example, these institutions were marked by an unshakeable focus on student learning emphasized in their missions and operating philosophies. They also adapted their physical campus properties and took advantage of the surrounding environment in ways that enriched students' learning opportunities. Put another way, aspects of the institutional cultures appeared to explain more of what mattered to

student success at these schools than variables typically examined in studies of institutional and student performance.

Given the powerful relationship between engagement and positive educational outcomes, it is not surprising that Astin (1985, p. 36) argued that "the effectiveness of any educational policy or practice is directly related to the capacity of that policy or practice to increase student involvement." Some student engagement surveys are designed to assess the effectiveness of these institutional policies and practices (see Kuh et al., 1997). The most widely used instrument at this time is the *National Survey of Student Engagement* (NSSE) (Kuh, 2001a, 2003).

The NSSE was developed as an alternative to reputation- and resource-based ratings of news magazines and college guidebooks. Rather than ranking institutions, data from the NSSE survey, *The College Student Report*, provide colleges and universities with information about the activities in which their students engage and point to areas where improvement may be needed. Results from the first 4 years of the survey were generally consistent with previous theory and research on student engagement. Students attending small, selective liberal arts colleges tended to be somewhat more engaged than their counterparts at large public universities (Indiana University Center for Postsecondary Research, 2000, 2001, 2002). However, there was substantial variation in institutions' student engagement scores within institutional categories as represented by Carnegie classification and size. Moreover, institutions with high engagement scores in one area generally did not have high scores in all areas (Kuh, 2001a; 2003).

The findings that institutions with similar characteristics and missions differed substantially in both levels and types of engagement raise an important question:

> Is it possible to create a typology of engaging institutions that is independent of the traditional Carnegie classifications?

The answer to this question is important for two reasons. First, as pointed out earlier, extant research shows that the Carnegie classification does not reliably distinguish institutions in terms of their educational effectiveness as represented by student engagement. Second, being able to classify institutions according to levels of student engagement will make it possible to identify colleges and universities that may be used as benchmarks by other schools with similar missions and other characteristics.

A similar study was conducted by (Braxton, Smart, and Theike 1991). They sought to type institutions and compared those types to Carnegie classifications. The principal difference between the two studies was that Braxton and his colleagues based their typology on student outcomes

measures, rather than measures of student engagement. Braxton and his colleagues found little relationship between Carnegie classifications and outcomes types. Such a finding may be predictable, given that the effects of college characteristics on student outcomes tend to be indirect (Pascarella and Terenzini, 1991). Student engagement is more directly influenced by institutional characteristics (Astin, 1984, 1985) and should be more closely related to Carnegie classifications. For this reason, and the reasons mentioned earlier, we set out to determine whether 4-year colleges and universities could be sorted into meaningful categories based on patterns of student engagement.

RESEARCH METHODS

A variety of approaches can be used to generate typologies (see Aldenderfer and Blashfield, 1984; Kruskal and Wish, 1978; Rummel, 1970). The approach selected for the present research was *Q* factor analysis (Burt, 1937; Stephenson, 1953). According to Cattell (1952, p. 101), "*Q* technique is most useful if one wishes immediately to see how many types there are in a population and to divide it up into types." One advantage of *Q* factor analysis over cluster analysis is that institutions can belong to more than one engagement type (Gorsuch, 1983). An important practical advantage of *Q* factor analysis, as opposed to multidimensional scaling, is that commercially available factor analysis programs can accommodate very large data sets (Kruskal and Wish, 1978).

Participating Institutions

The data for this study came from the 2001 administration of *The College Student Report*, the most recent administration of the survey at the time of the research. The NSSE 2001 respondents included 177,103 first-year and senior students who were randomly selected from the populations of 321 participating colleges and universities. Students at 261 institutions had the option of responding either via a paper-and-pencil questionnaire or via the Web. Sixty schools opted for web-only administration of the survey. Of the 321 institutions, 4 were excluded from the study because of specialized missions and/or very low numbers of respondents. Table 1 displays the characteristics of the NSSE 2001 institutions and a national profile of all 4-year colleges. These data show that the NSSE institutions were very similar to the national profile in terms of geographic region and urban–rural location. Baccalaureate-General colleges were underrepresented among the NSSE participants,

TABLE 1. Characteristics of Institutions Participating in NSSE 2001

	NSSE 2001	National
Carnegie Classification		
Doc/Res-Ext	16%	11%
Doc/Res-Int	10%	8%
Master's I and II	42%	43%
Bac-Liberal Arts	21%	16%
Bac-General	11%	23%
Sector		
Public 4-Year	48%	36%
Private 4-Year	52%	64%
Region		
Far West	9%	10%
Great Lakes	20%	16%
Mideast	19%	19%
New England	9%	9%
Plains	8%	11%
Rocky Mountains	3%	3%
Southeast	22%	26%
Southwest	9%	7%
Location		
Large City	20%	19%
Mid-Size City	32%	29%
Urban Fringe Large City	17%	17%
Urban Fringe Small City	7%	8%
Large Town	5%	4%
Small Town	13%	17%
Rural	5%	6%

whereas Doctoral/Research-Extensive and Baccalaureate Liberal Arts institutions were overrepresented among the NSSE participants.

Only seniors were included in the current study for two reasons. First, they have had a wider range of experiences during college and arguably can provide more informed reports about a variety of college activities. Second, the experiences of first-year students and seniors differ substantially in terms of curriculum (coursework for first-year students emphasizes general education, while seniors are concentrated in the major) and out-of-class experiences (first-year students spend more time on formal extracurricular activities while seniors may have studied abroad, done internships, and so forth) (Pascarella and Terenzini, 1991). Thus, it would be difficult to construct a meaningful institutional typology of engagement from a combined sample of both first-year and senior students.

The overall average unadjusted institutional response rate for NSSE 2001 seniors was 41.8%. Response rates ranged from 9.1% to 69.7%. About 69% of the seniors completed the paper version of the survey, and 31% completed the survey via Web. Generally, administration mode does not affect the results, with the exception that web respondents tend to report greater use of electronic technology (Carini, Hayek, Kuh, Kennedy, and Ouimet, 2003). Table 2 displays the characteristics of NSSE 2001 senior respondents in comparison to the characteristics of all seniors at the participating institutions. The results presented in Table 2 indicate that women tended to be overrepresented among the respondents, as were Caucasians and full-time students. However, the observed differences between respondents and the total population were relatively small.

Measures of Student Engagement

The NSSE *College Student Report* asks students to indicate the frequency with which they engage in activities that represent good educational practice and are related to positive learning outcomes (Kuh et al., 2001). Self-report data is widely used in research on college effects, and the validity and credibility of these data have been studied extensively (see Aaker, Kumar, and Day, 1998; Baird, 1976; Berdie, 1971; Bradburn and Sudman, 1988; Converse and Presser, 1989;

TABLE 2. Characteristics of NSSE 2001 Senior Respondents

	NSSE Respondents	NSSE 2001 Schools
Gender		
Men	35.4%	41.9%
Women	64.5%	58.1%
Race/Ethnicity		
African American/Black	5.8%	8.0%
American Indian/Alaska Native	0.6%	0.7%
Asian/Pacific Islander	5.3%	4.2%
Caucasian/White	79.0%	75.4%
Hispanic	4.2%	5.8%
Other	0.2%	2.9%
Multiple	4.8%	NA
International	4.0%	3.0%
Enrollment Status		
Full-Time	83.1%	77.7%
Part-Time	16.9%	22.3%

Gershuny and Robinson, 1988; Pace, 1985; Pike, 1995; Pohlmann and Beggs, 1974; Turner and Martin, 1984; Wentland and Smith, 1993). Research shows that self-report measures are likely to be valid under five conditions:

(1) the information requested is known to the respondents;
(2) the questions are phrased clearly and unambiguously;
(3) the questions refer to recent activities;
(4) the respondents think the questions merit a serious and thoughtful response; and
(5) answering the question does not threaten, embarrass, or violate the privacy of the respondent or encourage the respondent to respond in socially desirable ways (Kuh, 2001b, p. 4).

Studies indicate that the *College Student Report* meets these five criteria and provides accurate and appropriate data about students' levels of engagement (see Kuh et al., 2001).

Traditionally, NSSE scores have been reported as five benchmarks: Level of Academic Challenge, Active and Collaborative Learning, Student Interaction with Faculty Members; Enriching Educational Experiences, and Supportive Campus Environment. Fifty questions from the *College Student Report* were summed to create 12 engagement scales. Items were included in a scale based on assessments of items' content similarity. These scales were calculated using procedures similar to those used to calculate the NSSE benchmarks, and the content of the scales paralleled the content of the benchmarks. For example, many of the items comprising the Course Challenge and Student Effort, Writing Experiences, and Higher-Order Thinking scales in this study were drawn from the Level of Academic Challenge benchmark. Items included in the Active Learning Experiences and Collaborative Learning Experiences scales were taken from the Active and Collaborative Learning benchmark, and the items comprising the Course-Related Interaction with Faculty and Out-of-Class Interaction with Faculty scales were taken from the Student–Faculty Interaction benchmark. Similarly, many of the items in the Varied Educational Experiences and Use of Information Technology scales were drawn from the Enriching Educational Experiences benchmark. The items included in the Support for Student Success and Interpersonal Environment scales came from the Supportive Campus Environment benchmark. The Experience with Diversity scale included items from the Active and Collaborative Learning and Enriching Educational Experiences benchmarks. Group-mean generalizability analyses (Cronbach, Gleser, Nanda, and Rajaratnam, 1972; Kane, Gillmore, and Crooks, 1976; Pike, 1994)

revealed that dependable (i.e., $Ep^2 \geq 0.70$) institutional means could be calculated using as few as 50 respondents.

Data Analysis

The data analysis was conducted in two phases. In the first phase, *Q* factor analysis was used to classify colleges and universities into types of engaging institutions based on similarities in their student-engagement profiles. Initially, engagement scale means were calculated for all 317 colleges and universities in the study. The institutional means were then normalized (i.e., transformed to *z*-scores) to eliminate scaling differences across the 12 student-engagement scales and prevent a general species factor from confounding the results (see Cattell, 1952). The data matrix was then transposed so that the columns were the 317 institutions and the rows were the 12 student-engagement scales. Correlations among the 317 institutions were calculated.

There is no agreement as to whether correlations or distance measures should be used in *Q* factor analysis. Correlations, unlike distances, are measures of pattern similarity and may group together institutions that have similar patterns on the 12 engagement scales, but very different means (see Guertin, 1971; Rummel, 1970). The advantage of using correlations is that the data are ipsatized after they are correlated, and "a normalized-ipsatized data matrix has almost all of any general factor eliminated from it" (Gorsuch, 1983, p. 316).

A principal components analysis of institutional means, using varimax rotation, was performed using the BMDP 4-M program (Dixon, 1992). An analysis using principal axis factoring of a reduced correlation matrix with squared multiple correlations in the diagonal did not produce substantively different results because the squared multiple correlations were also extremely close to 1.00. The number of factors (i.e., types) extracted was determined using eigenvalues, a scree test, and the substantive interpretability of the factors or types. Correlations and standard regression coefficients for institutions' normalized engagement scores and factor loadings were used in naming the student-engagement types. Institutions with factor loadings greater than or equal to 0.50 were classified as scoring high on a type, whereas institutions with loadings less than or equal to -0.50 were classified as scoring low on a type. Institutions with factor loadings less than 0.50, but greater than -0.50, were classified as scoring neither high not low on a type. Means on the normalized engagement scales were calculated for these groups and used as an additional check in naming the types.

In the second phase of the data analysis, classifications of institutions as high, low, or neither high nor low were cross-tabulated with measures of institutional mission (i.e., Carnegie 2000 classifications). χ^2 tests were performed, and the contingent proportions in the tables were used to interpret relationships between the student-engagement types and Carnegie classifications.

RESULTS

Student-Engagement Types

Six factors, representing 80% of the variance in institutional means, were extracted and rotated to identify student-engagement types. It is significant that a dominant general factor did not emerge from the analyses. The first factor accounted for approximately 21.5% of the variance in institutional means, and the second explained 16.5% of the variance. Even the sixth factor explained a non-trivial 8.4% of the variance in institutional means. Names of the engagement types, eigenvalues, and squared multiple correlations, prior to factor rotation, are presented in Table 3.

Table 4 presents the correlations and standard regression coefficients for institutions' student-engagement means and their loadings on the six rotated factors. Also included are group means for institutions classified as high, low, or neither high nor low on the student-engagement types.

Diverse, but Interpersonally Fragmented versus Homogeneous and Interpersonally Cohesive Institutions

An examination of the results in the first subtable reveals that the first factor is bipolar, representing two different student-engagement types. The

TABLE 3. Eigenvalues and Squared Multiple Correlations for the Student-Engagement Types

Engagement Type	Eigenvalue	SMC
Diverse, but Interpersonally Fragmented versus Homogeneous and Interpersonally Cohesive	68.24	0.215
Intellectually Stimulating	52.23	0.165
Interpersonally Supportive	40.75	0.128
High-Tech, Low-Touch	35.43	0.112
Academically Challenging and Supportive	29.91	0.095
Collaborative	26.69	0.084

TABLE 4. Correlations, Regression Coefficients, and Group Means

Scale	Correlation	Std. Reg. Coeff.	Low Mean	Neither Mean	High Mean
Diverse but Interpersonally Fragmented versus Homogeneous and Interpersonally Cohesive					
Course Challenge	0.01	0.16	−0.34	0.07	−0.21
Writing	−0.41	−0.22	0.50	0.08	−0.96
Higher-Order Thinking	0.04	0.15	−0.31	0.06	−0.15
Active Learning	−0.46	−0.28	0.59	0.08	−1.04
Collaborative Learning	−0.09	0.01	0.05	0.06	−0.45
Course Interaction	−0.16	0.12	0.10	0.07	−0.55
Out-of-Class Interaction	−0.23	−0.18	0.34	0.05	−0.63
Varied Experiences	−0.18	−0.09	0.20	0.03	−0.43
Information Technology	0.38	0.25	−0.49	−0.03	0.58
Diversity	0.50	0.56	−1.06	0.02	0.70
Support Success	−0.44	−0.17	0.51	0.08	−0.98
Interpersonal Environment	−0.58	−0.36	0.66	0.10	−1.19
Intellectually Stimulating					
Course Challenge	−0.11	−0.39	−0.15	0.03	−0.28
Writing	−0.04	−0.26	−0.02	0.02	−0.21
Higher-Order Thinking	0.30	0.22	−0.79	0.02	0.24
Active Learning	0.01	−0.18	−0.19	0.02	−0.16
Collaborative Learning	0.20	−0.10	−0.54	0.01	0.15
Course Interaction	0.41	0.26	−1.10	0.01	0.47
Out-of-Class Interaction	0.64	0.45	−1.51	−0.01	1.01
Varied Experiences	0.72	0.61	−1.62	−0.01	1.07
Information Technology	0.30	−0.06	−0.64	0.02	0.14
Diversity	0.11	−0.14	−0.30	0.04	−0.28
Support Success	0.17	−0.03	−0.68	0.03	0.07
Interpersonal Environment	−0.07	−0.27	−0.29	0.05	0.42
Interpersonally Supportive					
Course Challenge	0.08	−0.12	−0.23	0.03	−0.30
Writing	−0.24	−0.54	0.43	0.02	−0.64
Higher-Order Thinking	−0.04	−0.22	−0.12	0.03	−0.43
Active Learning	−0.10	0.02	−0.28	0.02	0.02
Collaborative Learning	−0.20	−0.22	0.23	0.02	−0.52
Course Interaction	0.20	0.25	−0.42	0.01	0.19
Out-of-Class Interaction	0.11	0.07	−0.31	0.02	0.02
Varied Experiences	−0.08	−0.21	0.07	0.00	−0.09
Information Technology	−0.37	−0.36	0.54	0.03	−0.87
Diversity	0.36	0.51	−0.98	0.02	0.60
Support Success	0.43	0.43	−0.76	0.00	0.73
Interpersonal Environment	0.43	0.37	−0.53	−0.02	0.74

TABLE 4. *(Continued)*

Scale	Correlation	Std. Reg. Coeff.	Low Mean	Neither Mean	High Mean
High-Tech, Low-Touch					
Course Challenge	−0.43	−0.31	0.72	0.02	−0.92
Writing	−0.25	−0.01	0.45	0.01	−0.60
Higher-Order Thinking	−0.34	−0.24	0.80	0.00	−0.79
Active Learning	−0.48	−0.24	0.91	0.01	−1.03
Collaborative Learning	−0.26	−0.28	0.66	−0.01	−0.48
Course Interaction	−0.23	−0.12	0.42	0.01	−0.61
Out-of-Class Interaction	−0.12	−0.05	0.14	0.03	−0.56
Varied Experiences	−0.04	0.10	0.02	0.02	−0.33
Information Technology	0.59	0.82	−1.29	0.02	0.85
Diversity	−0.22	−0.13	0.47	0.01	−0.52
Support Success	−0.16	0.22	0.20	0.01	−0.40
Interpersonal Environment	−0.06	0.25	−0.28	0.04	−0.34
Academically Challenging and Supportive					
Course Challenge	0.58	0.71	−0.86	−0.06	1.81
Writing	−0.05	−0.16	0.08	−0.02	0.28
Higher-Order Thinking	0.26	0.36	−0.35	−0.04	1.01
Active Learning	−0.17	−0.41	0.43	−0.01	−0.09
Collaborative Learning	−0.29	−0.50	0.56	0.01	−0.58
Course Interaction	0.10	0.03	−0.11	−0.02	0.61
Out-of-Class Interaction	0.01	−0.02	0.12	−0.02	0.36
Varied Experiences	0.11	0.08	−0.10	−0.04	0.95
Information Technology	−0.15	−0.12	0.19	0.00	−0.06
Diversity	−0.11	−0.34	0.29	0.00	−0.13
Support Success	0.28	0.13	−0.48	−0.02	0.80
Interpersonal Environment	0.31	0.20	−0.46	−0.02	0.76
Collaborative					
Course Challenge	0.14	0.24	−0.60	0.00	0.29
Writing	−0.26	−0.53	−0.16	0.02	−0.55
Higher-Order Thinking	−0.12	−0.27	−0.42	0.01	0.05
Active Learning	−0.15	−0.24	−0.75	0.02	−0.32
Collaborative Learning	0.52	0.80	−1.50	−0.01	1.47
Course Interaction	0.11	0.06	−0.77	0.01	0.11
Out-of-Class Interaction	0.23	0.22	−1.10	0.01	0.34
Varied Experiences	0.00	−0.23	−0.65	0.01	−0.19
Information Technology	0.23	0.14	−0.82	0.00	0.47
Diversity	−0.27	−0.41	−0.35	0.03	−0.89
Support Success	0.14	0.13	−0.81	0.01	0.23
Interpersonal Environment	0.13	0.18	−0.74	0.01	0.31

presence of bipolar types in this study is consistent with findings reported by Guertin (1971). Institutional means on the Experiences with Diverse Groups scale were positively correlated with the loadings, whereas Interpersonal Environment means were negatively correlated with the loadings (0.50 and −0.58, respectively). The corresponding betas were 0.56 and −0.36, respectively. Institutional means for writing, active learning, and student success also were negatively related to the loadings, but the strength of these relationships was substantially less than the strength of the relationship for the interpersonal environment. Thus, the first factor seems to distinguish between institutions characterized by diversity and institutions characterized by positive interpersonal relations. The institutions typed by this factor can be characterized as either diverse, but interpersonally fragmented or homogeneous and interpersonally cohesive. An examination of the group means for institutions classified as either high or low on the first engagement type supports this interpretation. Institutions with high positive loadings on the first factor had a positive mean on the diversity scale (0.70) and a negative mean on the interpersonal environment scale (−1.19). Institutions with large negative loadings on the first engagement type had a positive mean on the environment scale (0.66) and a negative mean on the diversity scale (−1.06).

Intellectually Stimulating Institutions

Two engagement scales, Out-of-Class Interaction with Faculty and Varied Educational Experiences, were positively correlated with loadings on the second factor (0.64 and 0.72, respectively). The standardized regression coefficients for the two scales also were positive and statistically significant (0.45 and 0.61, respectively). Course-Related Interaction with Faculty also was positively related to the second factor, although the strength of the relationship was much weaker than for the other two scales. Means on the Varied Experiences and Out-of-Class Interaction scales for those institutions with high loadings were large and positive (1.51 and 1.62, respectively), whereas institutions with low loadings had negative means on the Varied Experiences and Out-of-Class Interaction scales (−1.01 and −1.07, respectively). These institutions can best be described as intellectually stimulating colleges and universities.

Interpersonally Supportive Institutions

Three engagement scales, Experiences with Diverse Groups, Support for Student Success, and Interpersonal Environment, were positively

correlated with loadings on the third factor (0.36, 0.43, and 0.43, respectively). Standardized regression coefficients were also positive (0.51, 0.43, and 0.37, respectively). Institutions with high loadings on the third factor had positive means for the diversity (0.60), support (0.73), and environment scales (0.74), whereas institutions with low factor loadings had negative scale means (−0.98, −0.76, and −0.53, respectively). These colleges and universities are interpersonally supportive institutions.

High-Tech, Low-Touch Institutions

The correlations, regression coefficients, and group means for the fourth factor suggested that the underlying construct for this factor was engagement through information technology. The correlation between Use of Information Technology scores and factor loadings was 0.59, and the standardized regression coefficient was 0.82. The information technology scale mean for institutions with high loadings was 0.85, and the mean for institutions with low loadings on the factor was −1.29. The institutions typed by this factor are high-tech, low-touch universities.

Academically Challenging and Supportive Institutions

The fifth factor represented institutions that were academically challenging and supportive. These institutions had high levels of academic challenge and student effort. The correlation between institutional means on the Course Challenge and Student Effort scale and loadings on the fifth factor was 0.58. The standardized regression coefficient was 0.71. Institutions with high loadings on the fifth factor had a mean course challenge score of 1.81, and institutions with low loadings had a mean score of −0.86.

Collaborative Institutions

The results in the final subtable indicated that the sixth factor represented institutions with high levels of collaborative learning. The Collaborative Learning Experiences scale was positively correlated with loadings on the sixth factor (0.52), and the standardized regression coefficient was 0.80. The group mean for institutions with high loadings on the sixth factor was 1.47, whereas the mean for institutions with low loadings was −1.50. These institutions were labeled collaborative in this study.

Engagement Types and Carnegie Classifications

χ^2 tests of the relationships between engagement types and Carnegie classifications indicated that the different types of engaging institutions were related to differences in institutional missions; although the relationships generally did not support conventional wisdom that small, private liberal arts colleges have the highest levels of engagement. The relationships between engagement types and Carnegie classifications are presented in Table 5. χ^2 tests revealed that loadings on the first factor were significantly related to Carnegie classifications ($\chi^2 = 109.43$; df $= 10$; $p < 0.001$). An examination of the cross-tabulation of the first two engagement types in the first subtable and Carnegie classifications shows that diverse, but interper-

TABLE 5. Relationships Between Engagement Types and Carnegie Classifications

	High	Neither	Low	Total
Diverse but Interpersonally Fragmented versus Homogeneous and Interpersonally Collaborative				
Doc/Res-Ext	58.7%	9.8%	0.0%	15.5%
Doc/Res-Int	17.4%	11.2%	0.0%	10.4%
Masters I	19.6%	37.5%	55.3%	37.5%
Masters II	0.0%	4.5%	12.8%	5.0%
Bac-Lib Arts	4.3%	26.3%	12.8%	21.1%
Bac-General	0.0%	10.7%	19.1%	10.4%
Intellectually Stimulating				
Doc/Res-Ext	11.5%	18.4%	0.0%	15.5%
Doc/Res-Int	0.0%	11.2%	12.2%	10.4%
Masters I	15.4%	35.6%	63.4%	37.5%
Masters II	0.0%	6.0%	2.4%	5.0%
Bac-Lib Arts	73.1%	18.0%	7.3%	21.1%
Bac-General	0.0%	10.8%	14.6%	10.4%
Interpersonally Supportive				
Doc/Res-Ext	0.0%	16.9%	18.5%	15.5%
Doc/Res-Int	6.7%	10.0%	18.5%	10.4%
Masters I	46.7%	35.4%	48.1%	37.5%
Masters II	10.0%	4.6%	3.7%	5.0%
Bac-Lib Arts	23.3%	21.9%	11.1%	21.1%
Bac-General	13.3%	11.2%	0.0%	10.4%
High-Tech, Low-Touch				
Doc/Res-Ext	54.8%	12.6%	0.0%	15.5%
Doc/Res-Int	9.7%	11.4%	3.1%	10.4%
Masters I	22.6%	36.2%	62.5%	37.5%

TABLE 5. *(Continued)*

	High	Neither	Low	Total
Masters II	3.2%	5.5%	3.1%	5.0%
Bac-Lib Arts	6.5%	23.2%	18.8%	21.1%
Bac-General	3.2%	11.0%	12.5%	10.4%
Academically Challenging and Supportive				
Doc/Res-Ext	8.7%	16.4%	12.0%	15.5%
Doc/Res-Int	4.3%	10.8%	12.0%	10.4%
Masters I	0.0%	39.8%	48.0%	37.5%
Masters II	4.3%	5.2%	4.0%	5.0%
Bac-Lib Arts	56.5%	19.0%	12.0%	21.1%
Bac-General	26.1%	8.9%	12.0%	10.4%
Collaborative				
Doc/Res-Ext	11.1%	15.9%	14.3%	15.5%
Doc/Res-Int	18.5%	7.6%	50.0%	10.4%
Masters I	48.1%	37.0%	28.6%	37.5%
Masters II	3.7%	5.4%	0.0%	5.0%
Bac-Lib Arts	14.8%	22.5%	7.1%	21.1%
Bac-General	3.7%	11.6%	0.0%	10.4%

Doc/Res-Ext = Doctoral/Research-Extensive, Doc/Res-Int = Doctoral/Research-Intensive, Bac-Lib Arts = Baccalaureate Liberal Arts, Bac-General = Baccalaureate General.

sonally fragmented, institutions tended to be Doctoral/Research-Extensive, and to a lesser extent Doctoral/Research-Intensive, universities. All other Carnegie classes were underrepresented in this engagement type. Conversely, interpersonally cohesive colleges and universities tended to be Masters I and II institutions. Follow-up analyses revealed that the institutions with positive interpersonal environments tended to be private (70.2%) and have enrollments of less than 3000 students (49.6%).

χ^2 tests also indicated that institutions' loadings on the second factor were related to their Carnegie classifications ($\chi^2 = 65.76$; df = 10; $p > 0; 0.001$). The contingent proportions in the second subtable indicated that intellectually stimulating colleges and universities tended to be smaller Baccalaureate-Liberal Arts institutions. Chi-square results indicated that there was not a significant relationship between Carnegie classifications and interpersonally supportive institutions ($\chi^2 = 15.38$; df = 10; $p > 0.05$). In contrast, there was a statistically significant relationship between Carnegie classifications and high-tech, low-touch institutions ($\chi^2 = 52.65$; df = 10; $p < 0.001$). Institutions characterized by high levels of engagement using information technology tended to be Doctoral/Research-Extensive universities.

χ^2 tests also revealed that there was a statistically significant relationship between loadings on the fifth factor and Carnegie classifications ($\chi^2 = 33.01$; df $= 10$; $p < 0.001$). Specifically, academically challenging and supportive colleges and universities tended to be baccalaureate institutions, both Baccalaureate-Liberal Arts and Baccalaureate-General colleges. Most were private (73.9%) and 86.9% had enrollments of under 3000 students. There was also a statistically significant relationship between institutions' loadings on the final factor and their Carnegie classifications ($\chi^2 = 32.30$; df $= 10$; $p < 0.001$). Contingent proportions revealed that MastersI and, to a lesser extent, Doctoral/Research-Intensive institutions tended to have high levels of engagement in collaborative learning experiences. Furthermore, these collaborative colleges and universities tended to be public institutions (66.7%) and have enrollments ranging from 3000 to 10,000 students.

Limitations

While results are generally consistent with the results reported by NSSE across the first few years of its surveys, only 1 year of data was analyzed in this study. If more institutions participating in other years were included, the results might differ in unknown ways. The institutional categories were derived only from the responses of seniors. If a similar analysis was done using first-year students, different factors may have resulted. Also, the NSSE survey is relatively short and, as a result, some potentially positive educationally purposeful activities are not represented, such as experiences in residence halls, the performing arts, and so on. If questions related to these activities were included, perhaps different results would emerge. Also, if multiple institutional characteristics were employed in the analysis, such as percentage of students in different majors or a measure of students' socioeconomic status, different institutional types might be produced. Finally, while Q factor analysis is an accepted methodology for constructing typologies, other methods could produce different categories of institutions. Perhaps most important, Q factor analysis is a correlational procedure, and the χ^2 analyses provided measures of association. Consequently, the findings of this study are descriptive and do not imply causal relationships. Despite these limitations, the results of the present research do have important implications for theory and practice.

DISCUSSION

The results of this research confirmed the observations made in the first four NSSE national reports—that institutions differ in how they engage

students and that no institution is uniformly high or low across all measures of engagement. This study was able to identify seven types of engaging institutions:

- *Diverse, but Interpersonally Fragmented*. Students at these colleges have numerous experiences with diversity and tend to use technology, but do not view the institution as supporting their academic or social needs nor are their peers viewed as supportive or encouraging. All in all, not a very easy place to live and learn it seems.
- *Homogeneous and Interpersonally Cohesive*. Students at these colleges have relatively few experiences with diversity, but view the institution and their peers as supportive. These institutions are the mirror image of the first engagement type.
- *Intellectually Stimulating*. Students at these colleges are engaged in a variety of academic activities and have a great deal of interaction with faculty inside and outside the classroom. They also tend to engage in higher-order thinking and work with their peers on academic matters (i.e., collaborative learning).
- *Interpersonally Supportive*. Students attending these institutions report high frequency of diversity experiences and view their peers and the campus as supportive of their efforts. Students also have a reasonable amount of contact with faculty members inside and outside the classroom.
- *High-Tech, Low-Touch*. Information technology rules at these universities to the point of muting other types of interactions. There is a sense of stark individualism as little collaboration occurs, academic challenge is low, and the interpersonal environment is not a distinguishing feature of the campus.
- *Academically Challenging and Supportive*. Faculty set high expectations and emphasize higher-order thinking in traditional ways. Little active and collaborative learning is required. At the same time, students support one another and view the campus as supportive. A generally friendly and congenial place to be an undergraduate interested in learning.
- *Collaborative*. Peers rely on and are generally supportive of one another for learning, mediated somewhat by technology. Although there are few opportunities for experiences with diversity, students have a reasonable amount of contact with faculty, who along with other dimensions of the campus climate, are viewed as supportive.

An important focus of this study was to assess whether a typology of institutions based on student engagement could provide an alternative to

traditional Carnegie classifications. For student engagement to be independent of Carnegie classification, one would expect the six Carnegie types to be distributed evenly across the engagement types. This was not the case. Instead, engagement types were related to Carnegie classifications. This finding suggests that student engagement may better serve as a supplement, rather than an alternative, to the Carnegie classification system.

Counter to conventional wisdom, institutional type and engagement did not favor liberal arts colleges and universities. While many of the institutions with high levels of engagement in varied educational experiences, interaction with faculty outside of class, and course challenge and student effort were baccalaureate colleges and universities, other types of engagement were associated with other Carnegie classifications. For example, large public research universities had higher than expected levels of engagement with diverse groups of students and high levels of engagement through information technology. Master's institutions were most likely to be characterized by positive interpersonal environments, support for student success, and high levels of collaborative learning.

Even though Carnegie type was related in non-trivial ways to certain areas of engagement, it is both possible and probable that other institutional characteristics are shaping engagement in addition to the gross measure of mission that Carnegie purports to emphasize. For example, that students use electronic technology more frequently at doctoral extensive universities may be more a function of institutional investment in technology than other structural features of such universities. If smaller comprehensive universities made similar investments they, too, could be technology intensive in terms of student engagement, which is born out by the DEEP study (Kuh et al., in press). Similarly, there is nothing inherent in the structural elements of campus environments of masters-granting colleges and universities that explain why students find them more supportive overall of their educational endeavors. Indeed, of the various Carnegie types, these institutions may be among the more eclectic in terms of size, educational purposes, and other dimensions. Thus, efforts to understand how institutional mission and environments shape student engagement will have to take into account additional factors in their analyses if student engagement is to be explained by institutional characteristics.

The results from this study also indicate that the 12 engagement scales used in this study can serve as useful metrics for institutional assessment. The 12 scales were particularly effective at differentiating among institutions and among types of engagement. In fact, the relationships between the 12 engagement scales and the different types of engaging institutions are revealing. Some institutions were engaging in a single domain (e.g.,

challenging coursework, collaborative learning, or use of information technology), whereas other institutions engaged students across several domains (e.g., varied educational experiences and out-of-class interaction or experiences with diverse groups of students and a positive interpersonal environment). Moreover, all of the scales produced acceptable generalizability coefficients (0.70) with samples of as few as 50 students. When samples sizes approached 200 students, the group-mean generalizability coefficients were all in excess of 0.90. These levels of generalizability should allow many institutions to examine levels of engagement at the college or school level.

Among the more promising lines of using assessment for institutional improvement is to obtain reliable data at the major field or department level; faculty members are more likely to take responsibility for student engagement if they are certain the data represent "their" students. Thus, institutional researchers and assessment staff should consider ways to administer student engagement surveys and other tools that insure that a reasonable number of majors in a given area are among the respondents, which will allow disaggregation at the department level. Another approach is to collect data about student engagement directly from faculty, such as using the Faculty Survey of Student Engagement (http://www.iub.edu/~nsse/html/fsse.htm). Responses can then be compared from students and faculty members to determine where gaps exist in what faculty members expect and assume students are doing and what students actually do. Indeed, perhaps what appear to be institutional differences in student engagement that favor one type of institution over others on certain engagement dimensions are more a function of what faculty members require students to do rather than institutional characteristics.

Although the emergence in this study of different types of engaging institutions is encouraging, the relationship between interactions with diverse groups and the quality of the interpersonal environment at some institutions was disturbing. Recent court decisions have upheld preferential admission policies based on the premise that attracting a more diverse student body will lead to greater interaction among the groups, and ultimately lead to more positive relations among students (Hurtado, Dey, Gurin, and Gurin, 2003). This study provided support for the first part of the premise that diverse student populations lead to interaction with diverse groups. A follow-up analysis indicated that the institutions with high levels of diversity engagement tended to be from parts of the country with substantial minority populations and the institutions had relatively large minority enrollments.

It is the second part of the premise that was not uniformly supported in this study. For several institutions with high levels of engagement around

diversity, the interpersonal environment was reported to be negative. Instead, the most supportive interpersonal environments were found in institutions characterized by little interaction with diverse groups. Relatively few institutions had both high levels of diversity interaction and positive interpersonal environments. This finding provides a sharp contrast to the NSSE results reported by Umbach and Kuh (2003).

The findings of the current study may indicate that the tone of interactions among groups is a key factor influencing the interpersonal environment at an institution. When interactions among diverse groups are positive, perceptions of the interpersonal environment are likely to be positive, whereas negative interactions among groups may lead to perceptions of the campus environment that are negative (Hurtado et al., 2003). As a result, efforts to improve acceptance and appreciation of diversity may need to do much more than attract diverse students to campus and foster interaction among students. Interactions among diverse groups are most likely to have positive effects when the groups are of equal status, there are common goals and inter-group cooperation, authorities support group equality, and there are extended opportunities for group members to get to know one another (see Allport, 1954; Hurtado et al., 2003).

It is also possible that the association between interactions among diverse groups of students and negative perceptions of the interpersonal environment is spurious. Many of the institutions comprising the first engagement type are large research universities with reputations as academically rigorous institutions. High levels of diversity experiences and less-than-satisfying interpersonal relations may both accrue from the size and competitiveness of these institutions, rather than being directly and causally related.

Clearly, additional research is need to better understand the relationships among diversity of the student body, interactions among diverse groups of students, and the interpersonal environments at an institution. It would be especially instructive to learn more about the colleges and universities where students both report high levels of diversity experiences and perceive the interpersonal environment to be supportive, such as some of the institutions in the DEEP study (Kuh et al., in press). Such institutions may have in place policies and practices that could be adapted by other schools to improve the overall quality of the undergraduate experience.

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