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Examining How Residential College Environments Inspire the Life of the Mind

Jody E. Jessup-Anger

As postsecondary education is promoted as a necessity for participation in the 21st century economy, academics, policymakers, and the public have voiced concerns about the quality and coherence of undergraduate education (AAC & U, 2007; Barr & Tagg, 1995; Boyer Commission, 1998; U.S. Department of Education, 2006). Critics point to the size, scope, and multiple missions of large, public research universities as contributing to students' feelings of anonymity, lack of engagement, and disconnection from faculty (Astin, 1993; Boyer, 1987; Gaff, 1970; Gamson, 2000; Guskin, 1994; Hawkins, 1999; Jerome, 1971/2000). Although undergraduates may face more challenges at these universities than they might in a more intimate setting, these institutions remain a likely destination for many students to begin or complete their baccalaureate education because of their size, relative affordability, and diversity in educational offerings.

University administrators increasingly are turning to residential colleges and other types of living-learning programs to address the size and scale conundrum facing large research universities. By creating smaller enclaves of students living together initially, taking part in a shared educational endeavor, and using resources within their environment that stress academics

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(Inkelas, Zeller, Murphy, & Hummel, 2006), administrators and faculty purport to create the atmosphere of a small liberal arts college while still offering students the resources of a large university, including comprehensive research and library facilities (Magolda, 1994; Schuman, 2005). Implicit in the comparison of residential colleges to small liberal arts colleges is an assumption that these small enclaves within research institutions are devoted to the liberal arts ideal. That ideal consists of a clearly defined mission promoting students' intellectual development and values congruent with that mission, including a commitment to holistic student development, to democratic ideals, and to the creation of lifelong learners (Hawkins, 1999; Hirt, 2006; Kuh, Kinzie, Schuh, Whitt, et al., 2005; Michalak & Robert, 1981). Also implied by the comparison of residential colleges to small liberal arts colleges are assumptions regarding a high quality of instruction. Pascarella, Wolniak, Seifert, Cruce, and Blaich (2005) examined the environmental differences in liberal arts institutions, regional institutions, and research universities and found that liberal arts college environments in general generate the greatest student-faculty contact, active learning/time on task, academic expectations, and quality of teaching.

Despite the increasing popularity of residential colleges and other living-learning programs, research examining their effectiveness is limited. Many existing studies have focused on determining whether these environments are more effective than no intervention in promoting students' persistence (Pike, Schroeder, & Berry, 1997), academic achievement (Pasque & Murphy, 2005; Pike, Schroeder, & Berry, 1997), and social integration (Pike, 1999; Pike, Schroeder, & Berry, 1997). Recent research has broadened to include multi-institutional studies, including the National Survey of Living-Learning Programs (Inkelas, Brower, Crawford, Hummel, Pope, & Zeller, 2004) and delved deeper into examining differences among different communities within a single institution (Inkelas & Weisman, 2003; Stassen, 2003).

Virtually no attention has been paid to whether and how these environments promote values associated with the liberal arts education that they purport to emulate, including whether they deepen students' inclination to inquire and their capacity for lifelong learning. Identified by the Center of Inquiry in the Liberal Arts at Wabash College (n.d.) as one distinctive outcome of a liberal arts education, having a deep inclination to inquire would suggest that a student has a strong value for learning and thus a deep desire to learn. Closely connected to students' inclination to inquire is their capacity for lifelong learning, which is defined by Hayek and Kuh (1999) as students' ability to "learn to learn" and to interact effectively with others in a complex, information-based society" (p. 4). Whereas a deepened inclination to inquire promotes a value for and desire to pursue knowledge, a robust capacity for lifelong learning indicates that students have the skills or tools to act upon their value for inquiry.

Another concern with existing research on residential colleges and living-learning communities is that much of it is plagued with problems of analysis, as researchers have often aggregated the data they collect to the environmental level, disregarding the individual differences of students in these environments, which may include their motivation, sociodemographic characteristics, and experiences. By using an ecological approach accounting for the environmental context and individual characteristics (Moos, 1976, 1979, 1986), in this study I sought to examine how student attributes (including students' sociodemographic characteristics, college experiences, and motivation) and residential college environments were associated with students' inclination to inquire and capacity for lifelong learning. Using data collected from 1,811 students affiliated with 24 residential colleges at 10 large, public research universities throughout the United States, I investigated the following questions:

1. Does students' inclination to inquire or capacity for lifelong learning vary across residential college environments?
2. How are students' sociodemographic characteristics and motivation related to their inclination to inquire and capacity for lifelong learning?
3. Do the associations between students' sociodemographic attributes and motivation and their inclination to inquire and capacity for lifelong learning vary across residential colleges?
4. How is the environmental context, specifically the extent to which residential colleges promote liberal arts experiences, related to students' inclination to inquire and capacity for lifelong learning?
5. Is the association between students' motivation and their inclination to inquire and capacity for lifelong learning mediated by the liberal arts ethos of the residential college context?

CONCEPTUAL FRAMEWORK

In their comprehensive review of research related to college impact, Pascarella and Terenzini (2005) encouraged researchers to acknowledge the multitude of factors affecting student change and to adopt broader conceptual models that would take multiple sources of influence into account instead of relying on a single disciplinary perspective or dimension of students' experiences. Their call echoes that of human development researchers, who in the mid-1970s began to shift their research designs beyond traditional experimental models involving only a subject and experimenter (Bronfenbrenner 1979; Moos & Insel, 1974).

Rudolph Moos (1976, 1979, 1986) developed a social-ecological framework with which to evaluate educational settings. His work stemmed from

his observations that by focusing only on personal traits or environmental settings, researchers could not adequately account for variations in behavior (Moos, 1979). Moos's (1979) model "notes the existence of both environmental and personal systems, which influence each other through selection factors . . . [and] mediating processes of cognitive appraisal and activation or arousal (motivation)" (p. 4). These mediation processes typically arise when the environment necessitates a response and result in efforts at adaptation and the use of coping skills. Moos explained that common transitions and everyday situations demand coping and adaptation responses, and that coping and adaptation are not only mediators of outcomes, but are also outcomes themselves. My interest was in examining students' inclination to inquire (value) and develop the capacity for lifelong learning (skill set) in light of their personal characteristics (personal system) and residential college environments (environmental system), along with students' motivation and appraisal of their environment (mediation processes). These outcomes may change as students proceed through their collegiate experience and attempt to adapt to their environments (Banta & Associates, 1993; Chickering & Reisser, 1993; Kuh, Schuh, Whitt, & Associates, 1991). As a result, in this study, I considered students' inclination toward inquiry and their capacity for lifelong learning as their efforts to adapt to the collegiate environment. Thus, these efforts were situated in the coping and adaptation position of Moos's framework.

Relevant Literature

Inclination to Inquire. Psychologists and higher education researchers remain interested in understanding and measuring the development of students' inclination to inquire deeply into their life and academic pursuits (Biggs, 1993; Cacioppo & Petty, 1982; Cohen, Stotland, & Wolfe, 1955; Marton & Säljö, 1976, 1984). Drawing on the work of social psychologists Cohen, Stotland, and Wolfe (1955), Cacioppo and Petty (1982) developed a measure of individuals' "tendency to engage in and enjoy thinking," which they labeled the "need for cognition" (p. 116). Cacioppo, Petty, Feinstein, and Jarvis (1996) conducted a meta analysis of over 100 studies that used the original need-for-cognition scale and a shortened version developed by Cacioppo, Petty, and Kao (1984). They found that an individual's need for cognition is somewhat stable in the short term but not invariant because it can be developed or changed over time. Furthermore, one's need for cognition originates in past experience, is supported by memory and past behavior, is made apparent in one's day-to-day interactions, and influences how one acquires information and resolves conflicts (Cacioppo, Petty, et al., 1996).

The scale's robust psychometric properties and consideration of both dispositional and situational influences make it useful for measuring the cognitive outcomes of a liberal arts education, as it provides insight into

the extent to which students desire and value cognitive activities (Brown & Rogers, 2005).

Several higher education researchers have used the need-for-cognition scale specifically to examine students' inclination to inquire. As part of their study examining the impact of liberal arts experiences on liberal arts outcomes, Seifert et al. (2008) defined a liberal arts experience as "an institutional ethos that values student-student and student-faculty interaction within a supportive environment characterized by high expectations for developing the intellectual arts" (p. 108). Using this definition, they explored the extent to which liberal arts experiences predicted liberal arts outcomes. Among their findings relevant to this study was that the liberal arts experience variable significantly changed the amount of explained variation in students' inclination to inquire. Although Seifert et al.'s (2008) study advances the notion that liberal arts experiences do indeed influence the development of students' inclination to inquire, questions remain about whether residential college environments located in large research universities can replicate the liberal arts environment. Furthermore, the researchers acknowledged that their results may have been confounded by students' precollege tendencies (i.e., motivation) toward liberal arts outcomes.

Mayhew, Wolniak, and Pascarella (2008) also used the need-for-cognition scale to examine how educational practices influence students' development. They used the need-for-cognition scale as a proxy for "lifelong learning orientation," arguing that the scale provides a measure of students' intrinsic cognitive motivation, which they deemed a prerequisite for lifelong learning. They examined how curricular conditions and educational practices affected the development of lifelong learning orientations in undergraduate students, specifically exploring how provisions of opportunities for reflection, active learning, and perspective taking, influenced the students' lifelong learning orientations in five different courses. Among the findings relevant to the current study was that students' negative in-class interactions with diverse peers hampered growth in the need for cognition most significantly, while positive interactions in-class with diverse peers and instruction-based educational practices significantly promoted growth. Although Mayhew, Wolniak, and Pascarella (2008) used the need-for-cognition scale as a proxy for academic motivation, their study was not grounded explicitly in motivation theory and did not account for expectancy or affective aspects of motivation, including the role played by students' feelings of competence or autonomy in promoting their desire to learn or capacity for lifelong learning. Furthermore, the researchers did not examine the development of skills associated with lifelong learning.

Capacity for Lifelong Learning. Hayek and Kuh (1998, 1999) conducted two studies exploring the capacity for lifelong learning in college seniors.

The first, which compared cohorts of seniors from the 1980s and 1990s, examined three aspects: (a) the extent to which the students developed the capacity for lifelong learning throughout college, (b) whether the capacity for lifelong learning remained stable across those time periods even as the need for workers to participate in the knowledge economy increased, and (c) which types of institutions better helped students develop the capacity for lifelong learning (Hayek & Kuh, 1998). Findings relevant to my study included that those students within “selective liberal arts” institutions reported the highest capacity for lifelong learning in the 1980s and 1990s, with statistically significant increases occurring from the 1980s to the 1990s. The researchers acknowledged that their study failed to take into account students’ motivation, which may have influenced their gain in their capacity for lifelong learning. Furthermore, they urged additional research to determine how learning communities and other interventions promote the acquisition of lifelong learning skills.

Hayek and Kuh’s second study (1999) examined how college activities and environmental factors influenced undergraduate seniors’ development of lifelong learning capacities. Among their findings was that certain clusters of activities and environmental factors influence students’ capacity for lifelong learning, including students’ overall satisfaction with college, the amount of effort they devote to classroom activities, the amount of effort they devote to science and technology, and an institutional environment that values critical, evaluative, and analytical performance. Surprisingly, the researchers found that students’ participation in formal extracurricular activities and student-faculty interaction outside of class had low to no effect on students’ capacity for lifelong learning.

These two studies illuminate some environmental factors that influence students’ capacity for lifelong learning. Specifically, the finding that environments characterized as valuing critical, evaluative, and analytical performance are most effective in promoting students’ capacity for lifelong learning supports the concept that a residential college, with its emphasis on providing a small, liberal arts education with the resources of a research university, may be effective in promoting students’ capacity for lifelong learning. However, questions remain as to whether research universities can be successful in emulating this small liberal arts atmosphere. Furthermore, more research is needed to understand the intersection of students and these environments and, specifically, whether these outcomes are truly a reflection of the environment or alternatively of the student who is attracted to the environment.

Motivation. Among the shortcomings of existing literature examining the environmental influences affecting development of students’ inclination to inquire and capacity for lifelong learning (e.g., Hayek & Kuh, 1998; Mayhew, Wolniak, & Pascarella, 2008; Seifert et al., 2008) is its failure to incorporate

motivation theory into the examination of student and environment interaction. This oversight has resulted in enduring questions as to whether the positive outcomes of these contexts (which include selective liberal arts colleges, courses that promote active learning, etc.) are attributable either to their design or to the type of student attracted to the context. In order to clarify the influence of individual students and their environments, it is important to take students' motivation into account.

Many motivational theorists conceptualize individual motivation as a product of expectancy and value reasoning within the broader social milieu (Brophy, 2004; Svinicki, 2004; Wigfield & Eccles, 2000). The expectancy component of the motivation equation explores students' beliefs about their ability to perform a task; whereas the value reasoning component explores students' beliefs regarding the overall worth of the process (Brophy, 2004). The social milieu is the context in which the motivation occurs, which might be in a residential college, classroom, or work setting.

Perhaps most relevant to the current study, self-determination theory (SDT) is a motivation theory incorporating aspects of both the value and expectancy portions of the equation and planting them squarely in an environmental context. With roots in the Aristotelian view of human development, SDT embraces the assumption that people have innate, natural, and constructive tendencies to develop a unified and elaborated sense of self (Deci & Ryan, 2002). Despite this integrative tendency, SDT acknowledges that social-contextual factors can support or hinder the development of a unified and elaborated sense of self (Deci & Ryan, 2002). As a result, SDT predicts differing developmental outcomes based upon social-environmental conditions.

Self-determination theory hypothesizes that among the social-environmental conditions affecting developmental outcomes are three basic or fundamental psychological needs that must be met for development to occur. These needs include autonomy (described as a sense of choice or control over one's actions), competence (described as a positive feedback mechanism that signifies efficacy and improvement), and relatedness (described as secure relationships that provide a foundation for the growth of people's personalities and cognitive structures) (Deci & Ryan, 2000). A sense of well-being results when a person's basic needs for autonomy, competence, and relatedness are met. Moreover, these basic needs serve as a foundation for supporting an individual's internalization of motivation (Deci & Ryan, 2002). As a consequence, the more fulfilled students feel by having these needs met in a specific context, the more intrinsically motivated they will be.

STUDY DESIGN

I adopted a quantitative, cross-sectional survey design. By adopting an ecological perspective, I examined the associations of both personal and environmental characteristics with students' inclination to inquire and capacity for lifelong learning. The data I collected were hierarchical in nature, with lower-level observations (i.e., students) nested within environments (i.e., residential college settings) (Kreft & De Leeuw, 1998). Because the study explored the influence of both individual (Level 1) and organizational (Level 2) characteristics on individual-level outcomes, I employed hierarchical linear modeling (HLM) to analyze the data I collected.

Population, Sample, and Participants

The population of students to whom the study was intended to generalize included all students in residential colleges located within large public research universities. I used the Basic Classification Description of the Carnegie Foundation to identify the 136 universities included in my sampling frame. I then identified which of these had degree-granting (major or minor) residential colleges and found that 11 universities had 32 residential colleges embedded in them. I contacted the deans of 31 and invited them to participate in the study. (I excluded one residential college that had been established only two years earlier and which had been the site of my pilot study.) Ultimately 24 residential colleges opted to encourage students to participate in the study. Residential college administrators took varying approaches to recruiting students to participate in the study. The majority adopted a census approach, emailing a link to my survey instrument to all students and including the opportunity to win an incentive (\$100 gift card) for completion. Others sent me students' names, and I directly solicited their participation. My final analytic sample was comprised of 1,811 students affiliated with 24 residential colleges at 10 large, public research universities throughout the United States. The response rate across institutions was 5%, a point I discuss further in the limitations section.

The analytic sample approximates the national sample of Hispanic or Latino students, American Indian or Alaskan Native students, Native Hawaiian students, and multiracial students attending large public research universities (NCES, 2004). However, Black or African American students are underrepresented by about 8%, White students are underrepresented by 10%, and Asian students are overrepresented by about 13% in comparison to national averages of students attending large public research institutions (NCES, 2004). In addition, women are overrepresented in the analytic sample by about 20%. I provide complete descriptive information of the analytic sample in Table 1.

TABLE 1
DESCRIPTIVE INFORMATION OF ANALYTIC SAMPLE
RESIDENTIAL COLLEGE STUDENT CHARACTERISTICS (LEVEL 1)

<i>Variable Name</i>	<i>Mean</i>	<i>sd</i>	<i>Min.</i>	<i>Max</i>	<i>N</i>
Sociodemographic Variables					
African American	0.02	0.13	0	1	1811
Asian American	0.21	0.41	0	1	1811
Hispanic/Latino	0.07	0.26	0	1	1811
<i>White (reference group)</i>	0.56	0.50	0	1	1811
International	0.02	0.14	0	1	1811
Native Am. or Alaskan Native	0	0.05	0	1	1811
Native Hawaiian or other Pac. Is.	0.01	0.08	0	1	1811
Multiracial	0.1	0.3	0	1	1811
No response for race	0.01	0.1	0	1	1811
Male	0.33	0.47	0	1	1809
<i>Family Income \$50–110k (reference group)</i>	0.43	0.49	0	1	1740
Family income below \$50K	0.26	0.44	0	1	1740
Family Income above \$110K	0.31	0.46	0	1	1740
HS GPA	3.63	0.32	1.7	4	1749
First generation	0.24	0.42	0	1	1713
College Experience and Motivation Variables					
Years lived in the res. college	1.45	0.73	0	4	1774
Degree asp.—less than bach.	0.01	0.12	0	1	1802
Degree asp.—bach. (<i>reference group</i>)	0.15	0.36	0	1	1802
Degree Asp.—more than bach.	0.83	0.37	0	1	1802
Motivation	89.87	13.45	42	119	1737
Individual Liberal Arts Variables					
<i>(centered and entered at level 1)</i>					
Good teaching and high quality interactions with faculty					
- Classroom practices	42.42	6.42	11	55	1669
- Out-of-class interactions	17.03	4.03	5	25	1689
Acad. challenge & expectations	72.29	12.57	32	105	1531
Diversity experiences	25.24	6.16	8	40	1606
Interaction with peers	22.78	5.38	6	30	1628
Student Outcome Variables					
Capacity for lifelong learning	29.71	6.58	11	44	1769
Inclination to Inquire	54.45	8.27	18	75	1737
Environmental Variables					
<i>(group mean entered at level 2)</i>					
Good teaching & quality interactions with faculty					
- Classroom practices	42.45	1.70	40.16	46.93	24
- Out-of-class interactions	17.25	1.48	15.23	21.53	24
Acad. challenge & expectations	72.74	6.63	64.06	91.76	24
Diversity experiences	25.29	2.00	21.53	31.18	24
Interactions with peers	22.90	1.53	19.18	27.12	24

Data Collection Instruments and Variables

I developed my survey instrument using a compilation of several existing surveys and demographic questions.

Independent Variables. Predictor variables for the study included: (a) sociodemographic and precollege characteristics, (b) college experiences and motivation, and (c) liberal arts experiences.

Sociodemographic and Precollege Characteristics. I collected information on students' sex, race/ethnicity, parental education, family socioeconomic status, class year, high school GPA, number of years living on campus, and degree aspirations.

Motivation. Self-determination theory (Deci & Ryan, 1985, 2000) served as a foundation for measuring students' motivation. To operationalize the theory, I used the General Need Satisfaction scale (Gagné, 2003), which measures the degree to which individuals feel (a) that their choices and activities are self-determined (autonomy), (b) a sense of efficacy in their activities (competence), and (c) a sense of connectedness to others (relatedness).

I conducted principal components and reliability analyses of each subscale's variables to ensure construct validity. Based on these analyses, I modified the subscales. The modified autonomy subscale included five items, had one dominant factor explaining 50.72% of the variance, factor loadings ranging from .818 to .541, and reliability of $\alpha = .75$. Questions focused on students' beliefs that they could express their opinions and ideas and be themselves in most situations. The modified competence scale consisted of five items; one dominant factor explained 49.69% of the variance, factor loadings ranged from .832 to .536, and its reliability was $\alpha = .745$. Questions focused on students' beliefs that they are capable and accomplished. Finally, the modified relatedness subscale consisted of seven items, had one dominant factor explaining 50.45% of the variance, factor loadings ranging from .800 to .569, and a reliability of $\alpha = .828$. Questions focused on students' beliefs that others care about them and that they interact regularly with people whom they consider friends. I used the sum of the three subscales in my analysis. The reliability of the overall scale was $\alpha = .884$.

Liberal Arts Experiences. I adapted subscales of a liberal arts experiences scale originally developed by Pascarella et al. (2005) and adopted by Seifert et al. (2008) and Blaich and Wise (2008). This scale was designed to measure the institutional practices and conditions characteristic of effective liberal arts colleges, including "good teaching and high quality interactions with faculty," "academic challenge and high expectations," "diversity experiences," and "relationships with peers." Several items in the scale were from the NSSE instrument and were used with permission from Indiana University. To ensure that the scales measured specific constructs for my sample, I conducted principal components and reliability analyses of the variables associated with

each subscale and deleted variables in turn that loaded moderately on more than one factor and those with low factor loadings.

From the “good teaching and high quality interactions with faculty” scale, two factors emerged. The first, an 11-item scale that dealt with effective classroom practices, focused on students’ perceptions that faculty had a good command of what they were teaching, used time effectively, and were prepared for class. It explained 42.36% of the variance, had factor loadings ranging from .823 to .535, and a reliability of $\alpha = .911$. The second, a five-item scale that dealt with out-of-class interactions with faculty, focused on the students’ perceptions that their out-of-class interactions with faculty had a positive influence on their intellectual growth, personal growth, and career goals. It explained 13.82% of the variance, had factor loadings ranging from .839 to .640, and a reliability of $\alpha = .884$.

From the “academic challenge and high expectations” scale, one dominant factor emerged that dealt with students’ assessment of their academic experience as challenging and included questions focused on whether their coursework was designed to encourage them to consider multiple viewpoints, make judgments about the value of information, and challenge their classmates. The 21-item scale explained 36.91% of the variance, had factor loadings ranging from .718 to .397 (with 20 of the 21 factor loadings above .4), and a reliability of $\alpha = .912$.

From the “diversity experiences” scale, one dominant factor emerged that dealt with students’ experiences with diversity and included questions focused on students’ perceptions that they had meaningful interactions with students who were different from themselves, that they shared their personal feelings with students different than themselves, and that their residential college environment encouraged frequent interactions among diverse students. The eight-item scale explained 47.95% of the variance, had factor loadings ranging from .824 to .302 (six of the eight loaded above .4, and the reliability analysis revealed that the deletion of the other two would result in lower reduced reliability scores), and a reliability of $\alpha = .838$.

From the “interactions with peers” scale, one dominant factor emerged that focused on students’ perceptions that they developed meaningful relationships with peers in their residential college and that these relationships provided them a sense of belonging. The six-item scale explained 61.24% of the variance, had factor loadings ranging from .911 to .623, and a reliability of $\alpha = .910$.

Dependent Variables

The dependent variables of interest include students’ inclination to inquire and capacity for lifelong learning.

Inclination to Inquire. The inclination-to-inquire variable was operationalized using Cacioppo, Petty, and Kao’s (1984) short form of the need-for-

cognition scale, which measures “an individual’s tendency to engage in and enjoy effortful cognitive endeavors” (p. 306). To ensure construct validity, I conducted principal components and reliability analyses and adjusted the scale accordingly. The final 15-item scale explained 36.8% of the variance, had factor loadings from .688 to .277 (with 11 of the 15 above .4), and a reliability of $\alpha = .873$. It included questions focused on students’ value for problem solving, deliberating, and thinking abstractly.

Capacity for Lifelong Learning. The capacity-for-lifelong-learning variable was operationalized using the Capacity for Life-Long Learning index (Hayek & Kuh, 1999). (All items in the Capacity for Lifelong Learning index were used with permission from the CSEQ Assessment Program (Copyright 1998, Trustees of Indiana University).) “The ‘estimate of gain’ items represent the ability to ‘learn to learn’ and interact effectively with others in a complex, information-based society, indicating the extent to which students have acquired continuous learning skills” (Hayek & Kuh, 1999, p. 4). Again, I conducted principal components and reliability analyses. I found one dominant factor that explained 46.2% of the variance, had factor loadings from .800 to .428, and a reliability of $\alpha = .88$. The index included items asking students to indicate the extent to which their college experiences have led to their progress in areas including effective writing, critical thinking, understanding scientific development, and self-directed learning (Hayek & Kuh, 1999).

Limitations

Although careful steps were taken to ensure that the data I collected were reflective of students and their experiences in residential colleges, it is important to note two limitations. First, the primary data collection approach for the current study was a census; in most cases, every member of a residential college was asked to participate. This approach reduced the possibility of sampling and coverage errors. However, because so many students were surveyed, the response rate was low across institutions. The descriptive statistics of the sample indicate that there was a mostly representative sample and normal distribution of data. Also, because the chance to win a gift card was used as an incentive to encourage participation, it is possible that students completed the survey for varying reasons. However, the possibility remains that there is bias in the sample that may have implications for the generalizability of the findings.

Second, because some of the residential colleges were nested in the same university, some researchers might advise a three-level model to analyze the data. I chose not to use a three-level model because the relationships among students across residential colleges, even if they were in the same institution, were more distal. Thus, it did not make conceptual sense to account for the third level of analysis.

Data Analysis Procedures and Results

Using Hierarchical Linear Modeling to analyze the data collected addressed the analytic challenges found in many existing studies. This procedure accounted for the existence of varying levels of data, allowed for Level 2 variables to explain between-group variance in the Level 1 intercept, and permitted the exploration of cross-level interactions (Kreft & De Leeuw, 1998; Raudenbush & Bryk, 2002). I began my analysis by examining the descriptive statistics of the survey data, checking for missing data, assessing normality, examining outliers, and conducting bivariate correlations of the variables.

To ascertain whether students' inclination to inquire and their capacity for lifelong learning varied across residential college environments, I used HLM 6 to conduct a one-way analyses of variance with random effects (also called null models) to partition the variance in the outcome variables into between-residential college and within-residential college components. These null models allowed me to estimate the variation in students' inclination to inquire and their capacity for lifelong learning at the individual level (Level 1) and across residential environments (Level 2), and to obtain baseline values of deviance, which I subsequently used to assess the model fit of subsequent models (Hox, 2002).

After determining that a significant amount of variance in students' outcomes was attributable to their residential college environment, I calculated the intra-class correlation (ICC), or the proportion of the variance in each outcome that was explained by the grouping structure (which in this case was the particular residential college environment) (Hox, 2002). I found that the proportion of the total variance that existed between residential college environments was 8.8% for "inclination to inquire" and 5.3% for "capacity for lifelong learning."

I built Level 1 models for each of the outcome variables by regressing the inclination to inquire and capacity for lifelong learning outcomes on four blocks of variables to explore the relationship of these student attributes and the outcomes variables. I also examined the change in deviance scores, as a significant reduction would be indicative of better model fit (Kreft & De Leeuw, 1998). In addition, I used the within-residential college variance scores to estimate the within- and between-residential college variance explained calculations. I determined these scores at Level 1 by subtracting the within-residential college variance of a particular model from the baseline within-residential college variance estimated in the null model and then dividing by the within-residential college variance in the null model (e.g., $R^2 = \frac{(\sigma_{r/b}^2 - \sigma_{r/m}^2)}{\sigma_{r/b}^2}$) < where $\sigma_{r/b}^2$ is the Level 1 variance estimate from the null model (baseline) and $\sigma_{r/b}^2$ is the Level 1 variance estimate from the model in which the variance is explained (Hox, 2002). At Level 2, the

between-residential college calculation is the same, except that Level 2 variance components are used in each of the calculations (Hox, 2002).

The first block I entered was comprised of dummy-coded race/ethnicity variables and sex. The second block was comprised of sociodemographic and precollege characteristics (parents' income and education, and students' high school grade point average). The third block was comprised of students' college experience and motivation variables (including how many years they lived in the residential college, their motivation, and their degree aspirations). The fourth block of variables was comprised of the group-mean centered liberal arts experience variables. I opted to enter these liberal arts experience variables at Level 1 of the equation to capture students' individual views regarding their liberal arts experiences at their institution. I centered them to reduce multicollinearity. Also, since each residential college's mean of the liberal arts experience variables was entered at Level 2 of the model, it was important to account for individual students' views so as to better interpret the environmental context. Table 2 presents all the coefficients of the complete within-residential college models.

The final within-residential college model explained 13.3% of the variation within residential colleges of students' inclination to inquire and 27.1% of the variation within residential colleges of students' capacity for lifelong learning. The majority of within-residential college variation explained for both "inclination to inquire" and "capacity for lifelong learning" resulted from the addition of the college experience, degree aspiration, and motivation block of variables to the model, which elevated the variance explained from 5.3% to 12.5% for "inclination to inquire" and from 2.2% to 20.7% for "capacity for lifelong learning."

Next, I examined each of the Level 1 predictors in turn at Level 2 of each model, examining the change in deviance and the significance of the chi-square value to see if there was any variation in each variable's association with students' inclination to inquire and capacity for lifelong learning across residential colleges. I examined whether the association between the predictor variables and response variables remained constant across residential colleges (fixed effect) or whether the association changed significantly depending on the residential college context (random effect) (Raudenbush & Bryk, 2002). The only slope that varied significantly at the $p < .05$ level by environmental context was the "degree aspirations—more than bachelor's," ($\chi^2 = 8.123$), with a variance in slope of 9.77; however the magnitude of the difference was sufficiently small as to not have practical significance.

I then turned my attention to the group-level (between-residential college) model. For each outcome, I modeled the Level 1 intercept with each residential college's mean of the liberal arts experience variables. These models were random intercept models, since I allowed the intercept to vary

TABLE 2
ASSOCIATION BETWEEN STUDENTS' SOCIODEMOGRAPHIC CHARACTERISTICS, MOTIVATION, AND COLLEGE EXPERIENCES ON "INCLINATION TO INQUIRE" AND "CAPACITY FOR LIFELONG LEARNING"

	<i>Inclination to Inquire</i>		<i>Capacity for Lifelong Learning</i>	
	<i>Coefficient</i>	<i>sig.</i>	<i>Coefficient</i>	<i>sig.</i>
Intercept	51.648	***	26.050	***
Sociodemographic Variables				
<i>White (reference group)</i>				
African American	-0.786	n. s.	0.048	n. s.
Asian American	-3.280	***	0.141	n. s.
Hispanic/Latino	-1.530	n. s.	1.355	*
International	4.528	*	1.543	n. s.
Multiracial	-0.457	n. s.	-0.770	n. s.
Race-other	3.632	n. s.	4.291	*
No response	4.200	n. s.	-1.074	n. s.
Male	1.629	**	0.327	n. s.
First-generation student	-0.270	n. s.	0.268	n. s.
<i>Family Income \$50–110k (reference group)</i>				
Family income below \$50K	-0.462	n. s.	0.278	n. s.
Family income above \$110K	0.320	n. s.	0.169	n. s.
HS GPA	-0.176	n. s.	-1.059	^
College Aspiration Variables				
Motivation	0.138	***	0.126	***
Number of years lived in res. college	0.749	*	1.426	***
Degree aspirations:				
- <i>Bachelor's (reference group)</i>				
- Less than bachelor's	0.193	n. s.	-0.052	n. s.
- More than bachelor's	2.748	***	1.844	***
Liberal Arts Experiences				
Teaching & quality interactions w/ faculty				
- Classroom practices	0.184	***	0.049	n. s.
- Out-of-class interactions	0.112	^	0.171	**
Acad. challenge & expectations	0.041	^	0.096	***
Diversity experiences	0.137	**	0.077	*
Quality interactions w/peers	-0.175	**	0.004	n. s.
Variance Components				
Between residential colleges (intercept)	3.015	***	1.579	***
Between-res. colleges explained (proportion)	0.506	0.320		
Within-residential colleges	54.995	30.224		
Within-res. colleges explained (proportion)	0.133	0.271		
Reliabilities				
Intercept	0.663	0.659		
Deviance (FML)	7713.752	7201.752		

^ p < .1; * p < .05; ** p < .01; *** p < .001

relative to the contextual characteristics of the residential colleges. Specifically, intercept γ_{00} was a function of the grand mean across all residential colleges on the outcome variable (inclination to inquire or the capacity for lifelong learning) as well as the group-level liberal arts experience variables plus the random error for a specific residential college. Any significant reduction in the between-residential college variance was due to the explanatory power of the group-level variables (Hox, 2002). The between-residential college models, which included variables pertaining to an ethos marked by the liberal arts variables, explained 82.2% of the between-residential college variation in students' inclination to inquire. The model explained 77.5% of the between-residential college variation in students' capacity for lifelong learning. The majority of the between-residential college variation explained for inclination to inquire resulted from the addition of an environmental ethos promoting "academic challenge and high expectations." (See Table 3.) For the capacity for lifelong learning outcome, out-of-class interactions with faculty explained the greatest amount of between-environment variation. (See Table 4.)

In the final step of the modeling process, I examined the cross-level interactions between Level 1 and Level 2 variables. I was most interested in the roles of individual motivation attributes and residential college environments in promoting students' inclination to inquire and capacity for lifelong learning. Therefore, I focused my attention on exploring whether the association between environmental liberal arts experience variables (Level 2) and individual motivation (Level 1) had any relation to students' inclination to inquire or capacity for lifelong learning. Having already modeled the Level 1 intercept of each outcome variable with the Level 2 liberal arts environment variables and obtained a baseline deviance score, I added each group-level liberal arts experience in turn to the slopes of two different Level 1 variables, starting with "Degree Aspirations—More Than Bachelor's" and then focusing on "Motivation." In order to determine whether the cross-level association between each individual-level variable and liberal arts environment variable was significant, I examined the change in deviance and chi-square statistic. The cross-level interaction between students' motivation and the "classroom practices" component of "good teaching and high quality interactions with faculty" was significantly related to students' capacity for lifelong learning at the $p < .05$ level. The interaction effect was $-.02037$, meaning that a rise in teaching practices was associated with a very slight decline in students' motivation. From a practical perspective, the interaction coefficient was so small as to be all but insignificant. The other cross-level interactions of motivation variables (Level 1) and environmental liberal arts experience variables (Level 2) and students' inclination to inquire or capacity for lifelong learning were not significant across residential college context.

TABLE 3
ASSOCIATION BETWEEN ENVIRONMENTS MARKED BY LIBERAL ARTS EXPERIENCES
AND STUDENTS' INCLINATION TO INQUIRE

REML	Pars. Level 1 Model	Level 1 Sig.	Level 1 + Class Practices	Level 1 Sig.	Level 1 + Out of Class	Level 1 Sig.	Level 1 Challenge	Level 1 Sig.	Level 1 + Diversity	Level 1 Sig.	Level 1 + Peers	Level 1 + all Liberal Arts Exp.		
Intercept	51.559	***	14.270	n. s.	35.434	***	34.495	***	43.197	***	39.617	***	22.701	*
Context-Liberal Arts														
Teaching & quality interactions w/ faculty			0.879	***	0.942	**	0.235	**					0.598	^
-Classroom practices													0.166	n. s.
-Out-of-class													0.214	*
Acad. chal. & expect.													-0.310	n. s.
Diversity experiences									0.332	n. s.	0.527	n. s.	-0.311	n. s.
Quality int. w/peers														
Variance														
Between-res. col. (int)	3.037	***	0.996	**	1.917	***	1.549	**	3.014	***	2.860	***	1.084	*
Between-res. col. explained	0.502		0.837		0.686		0.746		0.506		0.531		0.822	
Within-res. col.	54.918		54.917		54.807		54.786		54.885		54.876		54.760	
Within-res. col. explained	0.134		0.134		0.136		0.136		0.135		0.135		0.137	
Reliabilities														
Intercept	0.665		0.422		0.568		0.521		0.664		0.664		0.441	
Deviance (FML)	7714.366		7698.630		7704.196		7700.994		7712.494		7711.477		7691.312	
Parameters	22		23		23		23		23		23		27	
Chi square statistic	15.736***		10.170**		10.170**		13.373**		1.872 n. s.		2.889 ^		23.055**	
DF	1		1		1		1		1		1		5	

^ p < .1; * p < .05; ** p < .01; *** p < .001

TABLE 4
ASSOCIATION BETWEEN ENVIRONMENTS MARKED BY LIBERAL ARTS EXPERIENCES
AND STUDENTS' CAPACITY FOR LIFELONG LEARNING

	<i>Parsimonious Model</i>	<i>Level 1 + Class Practices</i>	<i>Level 1 + Out of Class</i>	<i>Level 1 + Challenge</i>	<i>Level 1 + Diversity</i>	<i>Level 1 + Peers</i>	<i>Level 1 + all Liberal Arts Exp.</i>
<i>REML</i>	<i>Sig.</i>	<i>Sig.</i>	<i>Sig.</i>	<i>Sig.</i>	<i>Sig.</i>	<i>Sig.</i>	<i>Sig.</i>
Intercept	26.215	15.738	11.807	16.107	14.687	10.191	21.840
Context-Liberal Arts Experiences Teaching & quality							
interactions w/ faculty		0.248	n. s.				-0.417
-Classroom practices							1.103
-Out-of-class			0.845				-0.017
Acad. chal. & expect.				0.140			0.064
Diversity experiences					0.458		0.126
Quality int. w/peers						0.707	n. s.
Variance							
Between-res. col. (intercept)	1.575	1.578	0.676	1.236	1.316	1.028	0.554
Between-res. col. explained	0.321	0.320	0.709	0.468	0.433	0.557	0.775
Within-res. col.	30.176	30.161	30.072	30.099	30.089	30.080	30.104
Within-res. col. explained	0.272	0.273	0.275	0.274	0.274	0.274	0.274
Reliabilities							
Intercept	0.659	0.659	0.475	0.609	0.622	0.569	0.430
Deviance (FML)	7203.010	7201.368	7186.445	7195.304	7195.885	7192.010	7180.650
Parameters	21	22	22	22	22	22	26
Chi square statistic		1.641	16.565	7.706	7.125	11.000	22.360
DF		1	1	1	1	1	5

^ p < .1; * p < .05; ** p < .01; *** p < .001

SIGNIFICANCE OF RESULTS

In fitting the null model and calculating the ICC, I found that the residential college environment accounted for 8.8% of the variation in students' inclination to inquire and 5.3% of the variation in students' capacity for lifelong learning. At first glance, the amount of variation across environments may not seem noteworthy. However, when placed in the context that residential colleges are often considered more similar than different (Ryan, 1993; Smith, 1994) and that, in collegiate settings, more variation is found between individuals than between environments (Pascarella & Terenzini, 1991, 2005), it became clear that the variation across environments merited exploration. The differences in outcomes across environments held potential insight into what aspects of the environment are most closely associated with students' inclination to inquire or capacity for lifelong learning.

The findings also help to contextualize some of the mixed findings from existing studies. Specifically, those studies that aggregate the variance in student outcomes to the group-level and compare across environments (e.g., Inkelas & Weisman, 2003; Pasque & Murphy, 2005) may ignore the greatest source of variation, which are often individual characteristics and experiences (Pascarella & Terenzini, 1991, 2005). The results of the null model in the current study were consistent with college impact research (Pascarella & Terenzini, 1991, 2005) in that there was much more variation in students' inclination to inquire and capacity for lifelong learning within residential colleges than between residential colleges. By failing to examine the variation within residential environments, existing research may overlook important factors affecting student outcomes, or may overstate the environmental impact on student outcomes. On the other hand, the variation between environments, although small, was significant, and lends support to the argument that residential college environments and living-learning programs are not all the same (Inkelas, Longerbeam, Leonard, & Soldner, 2005; Wawrzynski & Jessup-Anger, 2010), and thus caution should be exercised when grouping students from these environments together without a strong rationale for doing so.

In fitting the within-residential college (Level 1) model, I was interested in examining the extent to which students' sociodemographic and precollege characteristics, college experiences and motivation, and individual perceptions of their liberal arts experiences were associated with their inclination to inquire and capacity for lifelong learning. I found that the overall within-residential college (Level 1) model explained 13.3% of the within-residential college and 50.6% of the between-residential college variation in students' inclination to inquire. The model explained 27.1% of the within-residential college and 32% of the between-residential college variation in students' capacity for lifelong learning. I frame my discussion of how the findings of

the within-residential college (Level 1) model relate to existing research using the blocks of variables I entered as a guide.

SOCIODEMOGRAPHIC ATTRIBUTES

Although the addition of the sociodemographic attributes to the model explained little of the within-residential college variation in students' inclination to inquire and capacity for lifelong learning (5.1% and .3% respectively), several of the significant associations between variables are worth discussing. First, it is noteworthy that Asian American students scored on average 3.28 points lower on the "inclination to inquire" scale than their White peers despite there being no difference in their scores on the "capacity for lifelong learning" scale. One possible explanation for their lower average scores is that the scale does not provide a true measure of Asian American students' inclination to inquire. In recent years, researchers have raised questions about the applicability of psychological models that were developed and tested using primarily White and often male students to women and students of color and have suggested alternative models (Cross & Fhagen-Smith, 2005; Josselson, 1987, 1996; Kodama, McEwen, Liang, & Lee, 2001; Torres, 2003).

In addition to the finding that Asian American students scored lower than their White peers, female students scored on average 1.629 points lower than males. This finding is especially interesting when one considers that the "need for cognition" scale, which was used to measure students' inclination to inquire, was tested for gender-bias when it was developed (Cacioppo & Petty, 1982). However, the tests were done almost three decades ago, and student demographics have changed considerably since that time with more diverse students attending college for myriad reasons. Like the argument made for why Asian American students as a group scored lower on the scale, a similar argument can be made for why female students scored lower than males. Another possible explanation for the lower average scores of Asian American and women students may be because both of these groups of students have historically had less access to higher education than their White and male peers (Thelin, 2004). As a result, these students may be socialized by family and society to focus more on the outcome of their college years in terms of degree attainment for their future success as opposed to developing a value for thinking.

A third interesting finding was that international students scored on average 4.5 points higher on the "inclination to inquire" scale than their White peers, even after accounting for such factors as family income and education, motivation, and degree aspirations. Although it is difficult to interpret the exact meaning of this finding because all international students are grouped together regardless of country of origin, it may indicate the reality that inter-

national students often must overcome more obstacles to get into college in the United States than their White (domestic) peers, and as a result, may have a more pronounced or thought-out value for learning than their peers. This finding aligns with Pizzolato's (2003) argument that high-risk students are often more self-authored than their peers because of the additional obstacles they have overcome in order to arrive at college.

In examining the association of sociodemographic variables and students' capacity for lifelong learning, two noteworthy results included the fact that Hispanic/Latino students scored 1.355 points higher, and Race-Other students (which was a category that combined Native Hawaiian and Native American students) scored 4.291 points higher on average than their White peers on the "capacity for lifelong learning" scale, even after accounting for potentially confounding variables. These results may again indicate that these students have a clear sense of why they are in college (Pizzolato, 2003) and thus are making greater gains than their White peers. Alternatively it could be that these students as a group entered with a lower benchmark from which to compare their progress than their peers and thus are making greater gains.

Finally, although the sociodemographic variables did not explain a large amount of variation within residential college environments, these variables did explain a considerable amount of the variation between residential college environments (50.6% of between-residential college variation in students' inclination to inquire and 32% of between-residential college variation in students' capacity for lifelong learning). These findings indicate that many of the significant sociodemographic characteristics that are associated with students' inclination to inquire and their capacity for lifelong learning are clustered in certain residential college environments. The findings support the argument that, if residential college research is aggregated to the environmental level, ignoring individual/within-environment variation, there is a risk of overstating the environmental influence, when in fact the findings may stem from the characteristics of individual students who are attracted to and clustered in specific environments.

PRECOLLEGE CHARACTERISTICS

The addition of the precollege characteristics (which included parents' education and income levels, and students' high school grade point average) explained little of the within-college and between-college variation in students' inclination to inquire and capacity for lifelong learning. The only marginally significant association was the negative association between students' high school grade point average and their "capacity for lifelong learning" score. This finding seems antithetical to conventional wisdom; however, Seifert (2006) found similar results in her study of the effect of a

student's chosen major on 21st century competency development. Seifert argued that, in self-report studies of college impact, students who come into college with higher grades may have a higher benchmark from which to compare their progress and thus may report lower gains. In the case of my current study, that rationale makes sense, as the capacity for lifelong learning index measures students' self-reported gains in areas associated with the skills necessary for lifelong learning.

MOTIVATION, COLLEGE EXPERIENCES, AND DEGREE ASPIRATIONS

The addition of the motivation, college experience, and degree aspiration variables to the model explained the most variation in students' inclination to inquire and capacity for lifelong learning of any of the Level 1 blocks of variables. Although the positive association between students' motivation and their inclination to inquire and capacity for lifelong learning was small, its significance supports McCombs's (1991) assertion that to promote lifelong learning, educational settings should develop supportive climates conducive to cultivating personal relationships, a sense of control, and personal choice in students' learning process. The positive association also extends the reach of self-determination theory to the development of lifelong learners. However, the small significance of the association merits further exploration to determine whether the instrument is effective in capturing students' sense of autonomy, competence, and relatedness and also if the association deepens over time.

When taken together, the significant positive association between students' motivation, aspirations to obtain more than a bachelor's degree, and their inclination to inquire and capacity for lifelong learning support Hayek and Kuh's (1998) supposition that students' motivation to learn may play a role in the development of their capacity for lifelong learning and thus should be accounted for when examining factors that influence students' capacity for lifelong learning. Furthermore, although small, the results of the varying slope for the association between students' desire to obtain more than a bachelor's degree and their inclination to inquire suggest that this association may be stronger in certain circumstances, a finding that ought to be examined further in future studies.

The positive association between the number of years students lived in the residential college and their inclination to inquire and capacity for lifelong learning suggests that these outcomes may deepen over time as students become more integrated into the collegiate setting. However, it remains unclear whether the positive association between years spent in the residential college and the outcome variables is a result of students' interaction with their residential college environment or, rather, is a product of their maturation.

INDIVIDUAL LIBERAL ARTS EXPERIENCES

Admittedly, I was most interested in the addition of the liberal arts experiences variables at Level 2 of the model because they were more indicative of the potential influence of the environment on the outcome variables. That said, the addition of the group-mean centered liberal arts experience variables at Level 1 enabled me to ascertain the association between students' individual experiences with these variables and their inclination to inquire and capacity for lifelong learning, which I could then compare to the environment (Level 2) results. In addition, the addition of these variables at Level 1 served to control for students' individual beliefs about the environment, allowing me to hone in on the potential environmental impact.

Between-Residential College Model: Residential College Environments and Student Outcomes

In fitting the between-residential college (Level 2) models, I was interested in determining how an overall ethos marked by the liberal arts experiences (good teaching and high quality interactions with faculty, academic challenge and high expectations, diversity experiences, and quality interactions with peers) were related to students' inclination to inquire or their capacity for lifelong learning. The between-residential college model explained 82.2% of the between-residential college variation in students' inclination to inquire (32% of which was explained by the environmental liberal arts variables). Although three of the environmental liberal arts variables were significantly associated with students' inclination to inquire when entered individually into the Level 2 model (including both the "classroom practices" and "out-of-class interactions with faculty" components of the high quality interactions with faculty scale and the "academic challenge and high expectations" variable), only the "academic challenge and high expectations" variable remained significant at the $p < .05$ level in the final model. The association between the environmental "academic challenge and high expectations" variable and students' inclination to inquire was modest (.214 points), but noteworthy given that individuals' reactions to the liberal arts experiences were controlled for at Level 1 of the model.

Extensive research supports the notion that an environment marked by academic challenge and high expectations would enhance students' inclination to inquire. Researchers examining undergraduate success have found that students who are challenged in their academic environment report higher levels of development in a variety of areas (Astin, 1993; Chickering & Gamson, 1991; Cruce, Wolniak, Seifert, Pascarella, & Blaich, 2006; Kuh, Schuh, Whitt, & Associates, 1991; Pascarella & Terenzini, 1991, 2005; Seifert, 2006; Seifert et al., 2008). It is worth mentioning that even in a residential college environment, which arguably is deliberate in its attempt to provide students'

with a comprehensive undergraduate experience, there is still variation in students' perceptions of the level of challenge provided by the environment.

Also interesting to note were the differences in the results of the group-mean-centered individual liberal arts variables entered at Level 1 of the model and an environment marked by these variables (as indicated by the group-mean) entered at Level 2. The fact that the "out-of-class interactions with faculty" variable, "diversity experiences" variable, and "quality interactions with peers" variable were significant at Level 1 of the model, but not in the final Level 2 model (which included all of the Level 2 liberal arts variables) may indicate that these factors are most effective in influencing students' inclination to inquire only when they connected directly with students. On the other hand, the "academic challenge and high expectations" variable, which was significant in both the Level 1 and Level 2 final models, and the "classroom practices" variable, which was significant in the Level 1 model and marginally significant in the Level 2 model, may have a more distal impact on students' inclination to inquire, potentially creating an overall ethos that deepens students' inclination to inquire even when it does not directly engage a student. That rationale holds when one considers that the "classroom practices" and "academic challenge and high expectations" variables are less about relationships and more about students' general sense of their environment. These findings are supported by Mayhew, Wolniak, and Pascarella's (2008) findings that instruction-based practices, which were those that promoted active learning, discussion, multiple viewpoints, and self-reflection had an indirect effect on encouraging students' inclination to inquire.

Turning to the association of the environmental liberal arts variables and students' capacity for lifelong learning, the Level 2 model explained 77.5% of the between-residential college variation in students' capacity for lifelong learning (45.4% of which was explained by the environmental liberal arts variables). With the exception of the classroom practices component of good teaching and high-quality interactions with faculty, all of the environmental liberal arts experience variables were significant when entered on their own into the Level 2 model. However, in the final model, only the out-of-class interactions with faculty remained significant at the $p < .05$ level. This finding contradicts that of Hayek and Kuh (1999) who found that faculty-student interaction had little to no effect on deepening students' capacity for lifelong learning. The difference in findings is potentially explained by differences in the two samples, as students in the current study might have had more opportunity to interact with faculty, especially outside of class, because of their participation in the residential college.

The marginally significant negative association between "classroom practices" and students' capacity for lifelong learning was puzzling. However, examining the scale items of the "classroom practices" component in

the context of their association to students' capacity for lifelong learning raised questions about the fact that these items were mostly focused on instructor preparation, organization, and clarity. A classroom environment marked by these standards is unlikely to translate directly into deepening students' ability to learn to learn and apply concepts independently, unless these characteristics are coupled with developing a mastery orientation for learning (Dweck & Leggett, 1988), deepening students' appreciation for why the material is important (Brophy, 2004), and creating opportunities for active engagement with material (Chickering & Gamson, 1991). In fact, some of the practices might be associated with an instructor maintaining control over the classroom as opposed to developing autonomy in students (McCaslin & Good, 1992).

The disconnect between these instructional practices and students' capacity for lifelong learning may also explain the significant negative cross-level interaction between students' motivation and an environment marked by these classroom practices. The cross-level interaction between the two variables was so small as to lack practical significance; still, it adds weight to questioning whether a different measure of classroom practices—practices that might focus more on developing self-regulated learners—would more effectively capture the relationship between classroom practices and students' capacity for lifelong learning.

Similar to the changes in the significance of the association of the liberal arts experience and students' inclination to inquire at Level 1 and Level 2 of the model, there were also changes in the significance of these variables and in students' capacity for lifelong learning at the different levels of the model. Specifically, only the "out-of class interactions with faculty" component of the "good teaching and high-quality interactions with faculty" variable remained significant in the final models at both Level 1 and Level 2. The "academic challenge and high expectations" and "diversity experiences" variables, while significant at Level 1 of the model, were not significant at Level 2. These findings may indicate that, for this particular construct, which deals with building skills as opposed to deepening a value, the relationships that students develop with faculty are important in creating an environmental ethos that supports building a capacity for lifelong learning. Alternatively, it may suggest that students who are already committed to deepening their capacity for lifelong learning are especially likely to interact with faculty outside of the classroom.

IMPLICATIONS

In light of the findings of this study and the relationship of these findings with existing research, I offer implications for theory and practice and detail suggestions for future research.

Implications for Theory

The findings of this study contribute to higher education theory by reinforcing the calls of researchers (Pascarella & Terenzini, 2005; Renn, 2003, 2004; Renn & Arnold, 2003; Strange & Banning, 2001) to employ ecological models to understand student outcomes, especially when seeking to understand the influence of collegiate sub-environments on student learning and development. If the different levels of analysis were not accounted for, the environmental influence may have been overstated because of these clustered individuals. Likewise, by examining solely the characteristics that students bring to their sub-environment, researchers miss an opportunity to explore and make meaning of how different interventions are associated with deepening student outcomes. The ecological approach enables researchers to have the best of both worlds, in that they can examine and explore personal and environmental considerations together, acknowledging that these components are constantly interacting and informing one another.

The current study also continues the departure from much of the early research on living-learning communities and residential colleges, which sought to ascertain whether these environments were more effective in promoting student outcomes than no intervention (i.e., Pasque & Murphy, 2005; Pike, 1999; Pike, Schroeder, & Berry, 1997). The next generation of living-learning community and residential college research focuses instead on exploring which aspects of the residential college environment are most effective in promoting student outcomes and why. In addition, the study is the first to examine the effectiveness of residential college environments in promoting the liberal arts outcomes they purport to emulate. My study adds credence to the notion that a liberal arts environment can be created within a large public research university. However, it also raises additional questions about whether the emphasis of residential college environments in promoting deep peer relationships actually translates to deeper student learning.

Implications for Practice

My findings from this study offer an important contribution to practice, both within residential colleges and within postsecondary institutions more broadly. The study offers evidence that, by creating smaller enclaves, large research universities can be successful in creating a liberal arts environment by providing a challenging academic atmosphere and meaningful out-of-class interactions with faculty. Although research universities as a whole might be too large and have too many competing missions to provide a coherent and appropriately narrow message about promoting academic excellence and high expectations, a residential college environment is more suited to maintaining a consistent, scholarly message across all aspects of the college.

The first step in this process may be to ensure that there is a consistent and coherent message for administrators and faculty to convey, which means that residential colleges must examine their missions and educational purpose to determine if they promote academic challenge and high expectations (Kuh, 1999). After the message is determined, it should be conveyed through all aspects of the residential college, from admissions through graduation, by faculty, administrators, and students alike.

With regard to the importance of out-of-class interactions with faculty, existing research (Cox & Orehovec, 2007) illustrates that the quality of interaction often trumps the frequency of interaction, and therefore it is important for faculty and student affairs administrators to provide co-curricular opportunities for students that result in meaningful faculty-student interaction.

The results of this study also point to the importance of students' motivation in their inclination to inquire and to develop the capacity for lifelong learning. Existing motivation and teaching and learning literature sheds light on how faculty and administrators might deepen students' beliefs in these areas. Such strategies include providing students with opportunities to take charge of their educational pursuits, coupled with enough support and direction to do so (Baxter Magolda, 2004; Brophy, 2004), by providing appropriately challenging material so that students feel accomplished yet continually strive for excellence (Brophy, 2004; Chickering & Gamson, 1991; Svinicki, 2004), and by creating a classroom and residential environment that fosters collaboration and encourages risk taking (Brophy, 2004; Svinicki, 2004).

Suggestions for Future Research

There is much more research to be done to understand whether and how residential college environments promote the liberal arts outcomes they purport to emulate, not the least of which is examining their association with other liberal arts outcomes. The Center of Inquiry at Wabash College has identified several outcomes associated with a liberal arts education (Blaich, Bost, Chan, & Lynch, 2004) and recently launched the Wabash National Study of Liberal Arts Education to examine how these outcomes are fostered in liberal arts colleges and other types of institutions. To date, the study has not examined sub-environments, including residential colleges and living-learning communities. As these types of interventions continue to gain popularity at large public research universities, it is important that researchers incorporate them into their study designs. It is no longer possible to generalize that all students at large research universities have the same educational experience, as many of them are involved in initiatives that to varying degrees of success, scale down the campus and provide a more intimate educational experience.

CONCLUSION

The current economic climate is making college decisions even harder for students, while also highlighting their need to continue learning throughout their lives as they prepare to contribute to the 21st-century knowledge economy. It is also forcing postsecondary institutions to take a hard look at the effectiveness of their programs in light of declining budgets. With these pressures in mind, the results of this study indicate that postsecondary institutions can assist students in valuing learning and developing their capacity for lifelong learning by focusing on creating challenging environments that are marked by deliberate opportunities for faculty and student interactions outside of class.

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