

Running head: A MIXED METHOD ANALYSIS OF INTEGRATION OF LEARNING

A Mixed Method Analysis of Integration of Learning Among College Students

Cassie Barnhardt, Nathan Lindsay, Patricia M. King

University of Michigan

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Abstract

Many stakeholders in academe expect college graduates to demonstrate the integration of learning, which is an oft cited but rarely measured outcome of higher education. This study examined the integration of learning through a mixed method analysis of data from the Wabash National Study of Liberal Arts Education. The quantitative results suggest that students integrate their learning most effectively through diversity and assignment interventions, as well as by participating in learning communities. The interview data illustrate how students interpret their experiences and are able to make connections among their classes, and between their classes and other aspects of their lives. Across both sets of data, students' class years were prominent influences on integrated learning. These findings can serve as a roadmap to help faculty and administrators know how to encourage the integration of learning, and at what points these experiences are most appropriate.

A Mixed Methods Analysis of Integration of Learning Among College Students

Employers, policymakers, and others expect that college-educated individuals have the capacity to merge disparate ideas, synthesize multiple and contrasting points of view, and translate classical academic principles into tangible contemporary applications that respond to pressing issues (Colby, Ehrlich, Beaumont, Rosner, & Stephens, 2003; Hutcherson, 1999). Educators have come to talk about this kind of intellectual crossover as “integrative learning” (Huber & Hutchings, 2004; Newell, 1999). In their *Greater Expectations* report, the Association of American Colleges & Universities (AAC&U, 2002) characterize the goal of integrative learning as producing students who are:

Thinkers who can see connections in seemingly disparate information and draw on a wide range of knowledge to make decisions . . . [to] adapt skills learned in one situation to problems encountered in another: in a classroom, the workplace, their communities, or their personal lives. (p. 22)

This description of integrative learning depicts the manner in which a student interprets and processes information in an integrative fashion. By contrast, there is also a complementary body of literature on students’ abilities to integrate their learning that is more closely connected to educational practices, conditions, or opportunities which prompt this type of learning (Newell, 1999; Haynes, 2004; Bragg, Reger & Thomas, 1997). Such work has emphasized the integrative potential of capstone seminars, interdisciplinary courses, or intentionally themed residential programs.

Even though educators purport a common philosophical agreement that integrative learning is beneficial for students, a common frustration exists among educators stemming from both a “lack of models for reliably measuring how well students integrate their learning”

(DeZure, Babb, & Waldermann, 2005, p. 25), as well as a lack of precise information about campus practices and curricula that support integrative learning. Similarly, AAC&U's recent report, *Integrative Learning: Mapping the Terrain* (2004), cited the growing need for and importance of colleges and universities enlisting strategies that prompt students to integrate their learning "across courses, over time and between campus and community life" (p. 23). Although the need for students to become integrative learners has been identified, examples of ways in which students actually demonstrate this capacity for integrating different aspects of their learning is less well understood.

Our study seeks to shed light on the extent to which students develop the abilities to integrate their learning over the course of their college experience, and to understand the types of experiences and conditions that promote this type of learning. We are interested in *integration of learning*, reflecting a holistic interpretation of integrative learning. This approach looks simultaneously at the two dominant trends in the literature in an attempt to unite practices, conditions, and opportunities for learning with the developmental quality of improving one's ability to "connect information from disparate contexts and perspectives . . . [including] the ability to connect the domain of ideas and philosophies to the real world, from one field of study or discipline to another, from the past to the present, from one part to the whole, from the abstract to the concrete – and vice versa" (National Study of Liberal Arts Outcomes, 2003).

Background Literature

Integrative Learning as an Outcome

Integrative learning has links to Kegan's (1994) notion of meaning making and self-authorship (King & Baxter Magolda, 2005; Ignelzi, 2000; Huber, Hutchings, & Gale, 2005.), which is "how human beings make meaning of themselves, of others, and of their experiences"

(Ignelzi, 2000, p.5). Meaning-making is the means by which people come to actively contemplate and understand the various dimensions of themselves. Those who do so in a mature way become self-authored (Kegan, 1994), which carries with it “the capacity to internally define a coherent belief system and identity that coordinates engagement in mutual relations with the larger world” (Baxter Magolda & King, 2004, p. xxii). Integrative learning is conceived of as a continual and consuming process where ideas, reactions, knowledge, and feelings are “reshuffled” to construct a revised or new understanding of the world. Newell’s (1999) comments reflect this perspective:

[Students’] education is centered around encounters with different perspectives . . . it makes little difference to them whether the perspectives are held by an author they read, another student, their professor, or the guy standing beside them in the soup kitchen where they volunteer. Nor does it make a difference whether an insight comes from a book, a lecture, or a bull session Students have developed the habit of integration as a strategy for making sense of the world around them and for coping with its problems. (p.18)

Much of the empirical research on integrative learning comes from the community college or adult learning and vocational literature (Kerka, 2001; Bragg, Reger & Thomas, 1997; Hutcheson, 1999). This perspective is somewhat narrow in that it doesn’t necessarily focus on broad integration that is derived through a liberal arts education. By contrast, other scholars have looked at integration through specific curricular or pedagogical innovation (e.g., Haynes, 2004; Newell, 1999). However, these analyses have not necessarily focused on integration of learning as a multifaceted process that emerges from the cumulative exposure to and experiences in college. Consequently, the particular educational strategy focus on integrative learning falls

short of fully capturing all the dimensions of students' integration of learning in a comprehensive way. As Bloland (1996) notes:

The hallmarks of a college-educated person include: complex cognitive skills; the capacity of applying knowledge to practical problems; and understanding of individual differences; practical competencies; and a clear sense of identity, confidence, integrity, civic responsibility, etc. . . . The concepts of "learning," "personal development," and "student development" are interwoven and indivisible. . . . Experiences in class and out of class, on and off the campus, contribute to student learning and personal development. . . . Learning and personal development occur through the interrelationships developed between people, physical space, and socio-cultural environments. (p. 6)

Essentially, integrative learning is a dynamic synthesis of an individual's disparate thoughts, actions, and experiences. This synthesis is an important part of the *Student Learning Imperative* (ACPA, 1994), which further demonstrates the national interest in this concept by emphasizing how learning and personal development, as well as curricular and co-curricular experiences are all linked together.

Experiences Designed to Promote Integration of Learning

The ability of students to become integrative learners has emerged as an important and essential quality of professional and civic life. The National Commission for Cooperative Education's report (Hutcheson, 1999) focused specifically on the national need for integrating occupational and academic learning in postsecondary education:

The National Executive Forum explored the integration of learning and work in postsecondary curricula. Education, industry, and government leaders agreed on its importance for the education of a globally productive citizenry. What makes it so

relevant and timely is the confluence of learning theory research, state education reform, and School-to-Work initiatives that emphasize contextual learning, combined with the movement to identify skills for success in the multiple careers that most graduates will experience. (p.11)

Huber, et al. (2005) also emphasized the usefulness of integrative learning, noting that most people will experience some type of substantive change in their career multiple times during their adult life, and that contemporary professions require comprehensive approaches to decision making and strategizing. The authors remark on the necessity for college graduates to possess the cognitive flexibility to synthesize and understand issues:

The role of interdisciplinary collaboration and exchange is growing both within and outside of the academy. In government, industry, medicine, and higher education alike, problems are vetted and solved by bringing together people who are trained in different fields. Because of changes in knowledge and communication practices, including technological advances and globalization, all of us are faced with information that is fast moving, and more accessible than ever before, challenging the integrative and critical capacities of experts and novices alike. (p. 5)

Moreover, the professional community has been a strong advocate for overlapping the college curriculum with occupational skills; these connections are necessary and important tools for preparing students to be better problem solvers and to maximize the breadth of exposure that exists within colleges' general education requirements (Bragg, et al., 1997; Hutcherson, 1999).

While some educators have concerns about the idea of emphasizing occupational connections in the college curriculum, stemming from a fear of narrowly tracking students through job training or vocational programs (Bragg, et al., 1997), many faculty and student

affairs educators are generally supportive of curricular/ co-curricular and interdisciplinary links as mechanisms for helping students acquire a liberal education. In fact, the bulk of the research on integrative learning has been directed towards specific college interventions or pedagogical strategies such as interdisciplinary academic work, living learning community involvement, or highly reflective service learning programs (Newell, 1999; Haynes, 2004; DeZure, Babb, & Waldermann, 2005). These applications have been especially utilized in liberal arts institutions where vocational and occupational training take a lower priority.

DeZure, et al.'s (2005) analysis indicated that even among campuses that identified themselves as particularly supportive of integrative learning, their applications of it are quite different. They reviewed 139 campuses' integrative programs or curricula in an attempt to provide "a window into the current state of integrative learning nationally" (p.24). Within the group of campuses they considered, 16% offered learning community programs, 30% offered capstones (such as senior year or disciplinary culminating seminars) and first-year experiences, 37% implemented curriculum development activities to improve general education requirements or interdisciplinary course offerings, 63% offered faculty development programs to support faculty in modeling integrative thinking behaviors in their classrooms, and 18% of the campuses offered civic engagement activities (such as service learning or community partnership work) as integrative teaching techniques. Other strategies that institutions employed less often included study abroad and multicultural experiences.

In general, one of the most prominent applications of integrative educational strategies included overlapping curricular enhancement approaches with capstone and first-year experiences (DeZure, et al, 2005). In fact, the authors of this study remarked that these activities in particular are "promising sites for determining whether – and for ensuring that – students

integrate their learning” (p. 25) and that “sophomore or junior years, specifically middle-year and bridging programs” were noticeably absent (p. 25). One of the common frustrations among administrators from the campuses the authors considered was the “lack of models for reliably measuring how well students integrate their learning” (p. 25). Fully 70% of the campuses they studied desired an assessment process for measuring “student learning, skills, and attitudes, and program outcomes” (p. 25).

Regardless of whether occupational and academic approaches are pursued, the added value of integrative learning is it fosters a holistic view of students’ personal attitudes and views, collegiate experiences, and background characteristics. Kerka’s (2001) synopsis of integrative capstone experiences in technical education pointed to students’ interpretations that these experiences prompted them to “rethink and refocus their careers” and to “appreciate the holistic view” of their technical fields (p. 3). Drawing from Kerka’s framing, we aim to better understand both the manner in which students develop integrative learning and the experiences that accompany their development.

Method

To pursue our interest in integration of learning, we have chosen a mixed methods approach to answer our research questions. Despite the fact that mixed methods raise a number of epistemological and design issues (as noted by Creswell, 2003; Johnson & Onwuegbuzie, 2004; Jones, Torres, & Arminio, in press), we selected a process that capitalizes on the merits of exploring a general phenomenon in a variety of ways. Nevertheless, we believed that it was the most appropriate method for assessing this construct, as the use of two simultaneous approaches provides greater wholeness and perspective to our understanding of students’ integration of learning.

Through a mixed method approach, our intention is to use a conceptual design that would expand the *Mapping the Terrain* report (Huber & Hutchings, 2004), which specifically cited the need for assessments to address “key points and elements of integration . . . aimed at such learning needs that go beyond the classroom . . . [and] focusing instead on clusters of related courses and experiences” (p. 10). As a result, we examined the influence of students’ class year (freshman, sophomore, junior, senior) to explore key points of integrated learning along the college student trajectory. And then looked at the process of integration of learning as a holistic developmental process (Baxter Magolda & King, 2004), in order to maintain the integrity of the process, and expand on any latent dimensions that might be masked through quantitative analyses in isolation.

Data Source

The data for this study were taken from the pilot study of the Wabash National Study of Liberal Arts Education (WNSLAE). This mixed-method study is designed to understand the conditions and experiences that facilitate the acquisition of seven liberal arts outcomes, including the integration of learning¹. Students from four institutions participated in the pilot study: a southeastern regional comprehensive institution, as well as three midwestern institutions including a large research institution, a liberal arts college, and a community college. The numbers of participants were comparable across institutions. At each of the four institutions, students were randomly selected to participate. Among those selected, 723 completed a battery of assessment instruments; of these, 174 also completed individual interviews.

We considered several students background characteristics, including gender, family household income, minority status, pre-college academic ability (a measure based on ACT and SAT composite scores), and institution attended. Overall, the gender representation in this

sample was 67% female, and 33% male. Racially, this sample was composed of 80% White students, and 20% ethnic minorities including African American/ Black, American Indian/ Alaskan Native, Asian, Latino/ Hispanic, Native Hawaiian/ Pacific Islander, or other non-White.

Our mixed-method approach incorporated what Creswell (2003) refers to as a concurrent nested strategy, where one method takes on slightly more prominence than the other.

Accordingly, we first used quantitative analyses to determine which characteristics and experiences predicted aspects of students' integrative learning experiences, thus nesting the qualitative analysis in the quantitative data. Subsequently, we examined the interview data to illuminate students' specific thought processes for actively constructing meaning and verbalizing the kinds of connections embedded in courses and activities that led students towards integration of learning.

Quantitative Data and Analysis

For the quantitative analysis, data were procured from a 45-item questionnaire (*National Study of Liberal Arts Education Survey*, 2003) based on three conceptual groupings: background characteristics, collegiate experiences, and students' personal views. These variables were chosen particularly for their consistencies with the literature on experiences that promoted integrative learning.

Independent measures. The collegiate experience variables that we chose included participation in a learning community (20%), a residential living-learning community (13%), a study abroad program (6%), a first year seminar (52%), a senior seminar (30% of seniors), or internship program (19%). All of these variables were dichotomous categorical variables. We also included collegiate experience variables that indicated the number of hours a student volunteered each week, and the number of hours a student worked for payment, both of which

were interval scale variables. The average time students spent volunteering ($M = 1.56$, $SD = .743$) corresponded to one to five hours per week, and on average, students worked a total of 11 hours per week ($SD = 11$). Students' grade and credit year were also included along with the collegiate experience variables as measures to track progress through college. In our sample, students generally received grades in the A- to B range (median = 6, measured on a 1 to 7 interval scale where students' responses ranged from a 1 indicating grades were generally below a D, to a high score of 7 indicating grades were mostly in the A- to A range), (see Table 1).

Collegiate experience factors. In addition to the collegiate experiences previously described, we created two factors, one consisting of diverse interactions, and the other of integrative assignments. The diverse interactions factor represented the education that a student received by virtue of being a part of a college community or environment that included exposure to diversity. Specifically, this factor captured the frequency with which the student discussed serious social issues, race and ethnicity, divergent lifestyles and customs, diverse personal philosophies and values, and personal political opinions. The integrative assignments factor reflected specific curricular tasks regarding how often students were required to compare and contrast ideas, point out strengths and weaknesses of a point of view or argument, and argue for or against a particular position of view. Both factors included items that were scored on a 1 ("never") to 5 ("very often") Likert-type scale. The diverse interactions and integrative assignment factors had Cronbach's alphas of $\alpha = 0.883$, and $\alpha = 0.821$ respectively (see Appendix for factor loadings).

Personal view factors. In order to provide a measurement of students' personal views and perspectives, we developed two factors. The first, sociocultural values, indicated the degree to which students rated themselves as being inclined to attend to political structures, social values,

racial understanding, political affairs, being a leader in the community, or improving one's understanding of other cultures and countries ($\alpha = 0.783$). The second was intercultural values and attitudes, and is a composite of the degree to which students valued discussions with diverse people, believed college was a time for learning about difference, understood one's own values and beliefs better via talking with diverse others, perceived learning about different cultures as an important part of being at college, and viewed being around people of diverse backgrounds as an essential part of college ($\alpha = 0.838$).

Dependent measure: Integration of learning. To measure integration of learning (IL), we created a factor that reflected ways in which students' experiences encouraged them to think in integrative ways. The seven variables in the IL factor were based on a 1 to 5 Likert-type scale with a low score of 1 ("strongly disagree") to a high score of 5 ("strongly agree"). Students' responses to each item indicated the extent to which their experiences were helpful in teaching them how to: relate interpersonally to others; synthesize ideas and information from various sources; use curricular knowledge outside of class with friends, family members, or coworkers; link curricular / co-curricular and experiential learning with life events; connect formal learning with history and politics; and use formal learning experiences in college to help solve problems in other contexts. Cronbach's alpha for the integration of learning scale was $\alpha = 0.744$.

Statistical analyses. The effects of class year on students' integration of learning were assessed by using cross tabulation with chi square statistical tests and one-way analysis of variance to test the differences across class year on each of the independent variables. We performed an ordinary least squares linear regression with three blocks. Block one served to control for the effects of background characteristics (gender, minority status, household income, and the institution attended, precollege academic ability). The second block assessed the main

effects of collegiate experiences and students' personal views (this block included all of the factors diverse interactions, integrative assignments, sociocultural values, and intercultural values and attitudes). We also used a quadratic term for class year to test for its nonlinear effect on integration of learning; the quadratic was created by squaring and standardizing the class year variable. After obtaining the main effects and nonlinear effects in step two, we entered a third block with a stepwise regression to identify significant two-way interactions between independent variables.

Because integration of learning is assumed to be a higher order cognitive skill associated with college attendance, we looked more closely at the effects of class year by performing a two step OLS regression. The first step included three variables comparing the first year to the upper years, the first and sophomore years with the junior and senior years, and the first three years with the senior year. The second step tested the effects of all the independent variables on integration of learning. Finally, we performed a series of simultaneous regressions to examine the main effects of class year on students' IL. In these regressions, only the cases for class year of interest were analyzed respectively.

Qualitative Data and Analysis

Sample. During the quantitative portion of the WNSALE registration process, students indicated whether they were interested in participating in the interview portion of the study; from this volunteer group, a sub-sample of students was drawn to participate in an individual interview with a WNSLAE research team member lasting about 50 to 90 minutes. We attempted to balance the gender and racial composition of the interview sample for each of the four institutions to reflect the representation on the campus. The sample was also drawn to yield a

balance of first year and senior class students. A total of 174 students were interviewed across the four institutions. Students received a cash stipend for participating.

Data collection. In-depth interviews were conducted using an approach that incorporated both the “informal conversation interview” and “the general interview guide” (Patton, 1990, in Upcraft & Schuh, 1996, p. 63). Specifically, interviewers followed a general interview protocol that asked students to select and comment on the experiences they found meaningful during college. While there was continuity in the respect that interviewers followed a general protocol for inquiring about students’ backgrounds, college experiences, and how they made sense of these experiences, the interviewers were deliberate in allowing the students’ responses to lead the interview (Baxter Magolda & King, 2006). In this way, the interview was co-constructed by the interviewee (Ortiz, 2003) and was respectful and sensitive to exploring those topics and experiences that were particularly salient for students. Each interview was digitally recorded and transcribed verbatim.

To address the different developmental stages of students, two interview protocols were created, one for first-year students and one for seniors. The interview protocols contained three components. The initial segment addressed how students’ ways of constructing knowledge, self, and social relations and personal history affected their individual development. The second component addressed the educational experiences students regarded as key to their experience and why these particular experiences were important. We intentionally avoided asking narrow questions about a particular outcome¹, or particular courses or institutional practices, opting instead to invite the interviewee to lead us to their most relevant experiences. The third segment addressed how students interpreted and made meaning of these experiences as a whole, or the interaction of their personal meaning making and the experiences that enhanced their

development and learning during college. The concluding portion of the interview invited students to consider the ways in which they were synthesizing and integrating their learning.

Qualitative analysis. We chose a grounded theory approach (Charmaz, 2003; Patton, 2001) to analyze the interview data. Units of text were coded based on students' meaning making, similar units were categorized together, and then these were analyzed to determine overall themes and sub-themes. We then focused intently on individual units that emerged out of sub-themes related to collegiate integrative learning experiences. Approximately 100 quotations were found that demonstrated some degree of students' integration of learning, and most of these reflected an early developmental level stage of integration of learning and/or were brief in their articulation of the concept. From these 100 quotations with some indication of integration of learning, we selected eighteen "information-rich cases," which Patton described as manifesting "the phenomenon of interest . . . [with] excellent or rich examples" (Patton, 1990, in Upcraft and Schuh, 1996, p. 56).

These eighteen quotations were then examined on three dimensions, each following up on a finding from our quantitative analyses. First, they were clustered together according to students' class year. Then, we examined the selected data units to determine the extent to which students highlighted and discussed concepts characterized in the four factors (diversity interactions, integrated assignments, intercultural values and attitudes, or sociocultural values) that were used in the regression models as particular aspect of integrative thinking. Finally, we compared students' characterizations of integrative learning in the interview data with the individual items that comprised the integration of learning factor (see Appendix for specific item details). This final analysis served as intentional bridge between the objectively-derived

quantitative factor analysis process with the more subjective interview data in order to actively seek out consistencies and discrepancies in these different types of data.

Results

Quantitative Findings

The overall main effect of background characteristics, collegiate experiences and personal views on students' integration of learning was $R^2 = 0.459$, $p < .001$ (Table 2). Notably, across each of the three blocks, race, gender, and the type of institution attended did not affect students' IL. The collegiate experiences that had the most salient effect on students' IL were: integrative assignments where students had to argue for or against a particular point of view or defend an argument ($b=0.427$, $p \leq .001$), and diverse interactions ($b=0.212$, $p \leq .001$), defined as the frequency with which students engaged in serious discussions about race, religion, and equality or justice on campus. Students' personal views were also important predictors of integration of learning, particularly intercultural values and attitudes ($b=0.125$, $p \leq .001$).

Class year differences. Students' integration of learning increased with each educational level, ($F_{(3, 718)} = 18.24$, $p \leq .001$, see Figure 1). With respect to background characteristics, the only observed descriptive difference across the class year variable were students' pre-college abilities ($F_{(3, 718)} = 4.71$, $p \leq .01$), with upper class students having entered college with higher pre-college abilities (Table 1). In our examination of the effects on students' integration of learning across class year, our two-block regression model tested the contrasts of each class year incrementally. That is, as shown by our initial ANOVA analysis, the main effect of class year was sizable ($b = 0.469$, $p < .01$) and decelerating in a nonlinear fashion as evidenced by the quadratic class year variable ($b = -0.353$, $p < .05$, Table 3). Upon further examination of this nonlinear effect with a two-block regression model, we observed important effects on IL for the

first year ($b = -0.420, p < .001$). By contrast, sophomore and junior years were insignificant predictors of IL, and students' senior year status was only marginally useful in predicting students' IL ($b = 0.203, p < .10$). Even after controlling for the covariances of background characteristics, collegiate experiences and personal views, only the first year sustained its stronghold in predicting students' IL ($b = -0.272, p < .01$). In sum, this result suggests that students' capacities for integration of learning are most influenced by the first year of college, suggesting that the first year is the most critical time to provide students with opportunities to become integrative learners.

Class year affected students' integration of learning in several respects (Table 4). One of our interests in pursuing an analysis of the differing effects of class year on students' IL was to respond to DeZure, et al's (2005) call to better understand the middle college years.

Interestingly, we found unique patterns of influence in the sophomore and junior years. Whereas the overall main effect of learning community participation was $b = 0.176, p \leq .05$, when subdivided by class year, learning community participation was a significant covariate for only the junior year, with a very large effect size of $b = 0.480, p \leq .05$. Since students don't typically enter into a learning community for the first time in the junior year, this result suggests a cumulative effect from previous or ongoing learning community participation. Similarly, the main effects model indicated a marginal effect of sociocultural values on students' IL (Table 2; $b = .065, p < .10$), but when considering the covariance of sociocultural values across class years, the junior year emerged as a crucial time period ($b=0.202, p \leq .05$; Table 4).

Interactions. Despite a non-significant effect of first-year seminars on students' IL, there were interactions of first year seminars and pre-college academic ability, as well as assignment interventions. Even so, the interactions between first year seminar participation and pre-college

academic ability, and with integrative assignments (Figures 4 & 5, respectively) were not very promising educational practices relative to the integration of learning that occurred for students who were not a part of a first year seminar. Students who did not participate in a first year seminar had consistently higher IL scores compared to their peers who did have this experience. However, among those students who participated in a seminar, only students with the highest precollege ability scores were able to meet or surpass the scores of those who did not participate in a first year seminar (shown in Figure 4).

Additionally, students with varying levels of pre-college academic ability who did not participate in first year seminars performed consistently better than did first year seminar participants. Furthermore, the main effect of integrative assignments on IL was so substantial (shown in Table 2) that the additional value of the interaction of first year seminar participation and assignment interventions was small.

Residuals & unexplained variance. With 49% of the variance in students' integration of learning explained by the main effects and interaction effects of our overall three block regression model, there remains 51% of the total variance unexplained. The residuals provided a modest level of insight into unexplained variance. The residuals for the hierarchical regressions we performed were extremely close to being normally distributed, but with a slight pattern in the outlier statistics; the residuals from the four simultaneous regressions that considered the effects of class year closely mirrored these same distribution patterns. Therefore, the models utilized in this analysis have satisfied the necessary regression assumptions.

Our findings suggest that institutional sponsored programs (e.g., offering students integrative assignments, and communities that provide opportunities for many diverse interactions), coupled with students' intercultural values and attitudes serve as the strongest

factors in influencing the extent to which students experienced integration of learning. Students' learning community participation also emerged as a crucial educational catalyst for students towards promoting IL. The results generated through our main effects model, class year differences analysis, and interaction effects invite greater scrutiny of students' specific characterizations of integration of learning. More specifically, are the types of experiences and attitudes described by these factors consistent with the interpretations that students make when reflecting on their college life? In order to extend our understanding of students' integration of learning, we turn next to the qualitative portion of the results.

Qualitative Findings

Our qualitative interview findings elicited complementary data showing how students interpreted their integration of learning. One of the central themes in the interview data was students' awareness of the extent to which their experiences overlapped. As shown below, this was primarily demonstrated through connections students made among their classes, and between their classes and other aspects of their lives. Before providing examples illustrating these connections, however, we outline the findings from the three levels of analysis we used for this purpose, each of which was designed to examine the quantitative findings in more depth.

First, our analysis of class year differences in students' IL revealed that among the information-rich integration of learning quotes, approximately two-thirds came from seniors. Second, the qualitative results differed somewhat from the quantitative items that were significant in predicting the integration of learning (i.e., diverse interactions and assignment interventions). Although diverse interactions surfaced in two of the integration of learning data units, and integrative assignments were discussed in three units, these themes were not as prevalent as might be expected based upon the quantitative findings. Perhaps it is easier for

students to recognize integrative learning behaviors when responding to a survey, but they have greater difficulty in spontaneously producing parallel interpretations of one's life without prompting.

Finally, in our comparative analysis of the data units with the items from the integration of learning factor (see Appendix for specific items) we discovered some intriguing results. Across the data units we examined, students were most likely to discuss meaningful experiences that were consistent with synthesizing and organizing ideas, information, and experiences into new, more complex interpretations and relationships, as well as putting together ideas and concepts from different courses. In addition, there were several information rich cases that illustrated how students were making connections between their classes and out-of-class experiences. Students' reflections on IL were more closely tied to only three of the quantitative factor items rather than including all aspects of the IL factor. In this sample of examples, students generally did not attribute integrating papers, sharing ideas, connecting information to historical events, and problem solving in assignments as salient or memorable moments of IL.

A high proportion of the information-rich units could be characterized as containing instances of students making connections among their classes; however, in many of these instances individuals had difficulty articulating why these connections were significant or important. For example, they described these similarities as "nice" or "weird," but they didn't (or couldn't) explain why they felt this way or describe more fully the basis for the connection they had observed. Some students, however, were able to articulate meaningful connections among their courses. They could see similar themes and topics among their classes, and were able to see how various subjects were related. For example, Suzanne (all names are pseudonyms), a first-year student, explained:

My Polish literature class overlapped with my World Religions class... Poland was...very dedicated religiously to like Mary. So we were learning about Mary and World Religions and like I knew exactly what they're talking about. Like, we talked about that already. It's just odd. Like, the most bizarre classes overlap. It's nice because then you feel like you learn something. Like I know this. And then, you know, you can apply it more.

Some quotations revealed that students were able to integrate ideas across subject area boundaries. Jim, a senior, exclaimed that it was "really neat to see how all the classes at this point and this level kind of come together and kind of work off one another...everything starts to click because it's kind of playing off each other." He described with excitement how he saw connections among his chemistry, biology, and psychology courses and how this was making his learning easier. When asked for an example of this, he responded:

...like in psychology we're learning about the brain and the mind, and memory and everything which kind of plays a role obviously in biology like the study of life and everything. And animals and everything and you learn about the different processes that go on like cellular respiration that plays into chemistry and everything. And all of the chemical reactions that go in your brain and all the different processes that go on in the brain and everything like that so they kind of all three kind of play off one another, and it's kind of neat.

In addition to connections students made among their courses, some connections were discerned or developed between their courses and "the world." The following quotation demonstrates how a sophomore student discovered bridges between his classes and his external life.

It's about helping the community around you, and helping the world, so to speak... How do I apply my education to helping others? you know. Or helping the community... Like I said, you start realizing that college is not just about academics. It's more about the applications of academics, and how does that relate to the world.

Students from whom these examples were drawn also expressed instances of suddenly understanding the useful applications of what they were learning in class, and this occurred at various stages of their college experience. Some students talked about how their classes were preparing them for their careers, especially in applied fields such as nursing and education. They also expressed satisfaction in the lessons they were learning through internship opportunities, which often allowed them to see whether they wanted to pursue a career further. Sarah, a senior, was delighted to discover that she could combine her interests in nursing and politics, for both an internship and a career:

I mean I am obviously in nursing and after- like during the [Presidential] election I went and spoke to someone in the political science department...because I was so into it that I didn't know if I wanted to minor in it. I mean you know I had just you know never felt that like excited about and I mean like I stuck with nursing but that's kind of why I want to go to Capital Hill and you know just really do some work. Because there actually are quite a few nurses who end up like taking a political direction with it. And I, I don't think I realized that at first. I felt like if you're a nurse you're not a lawyer or a politician or whatever it is. Umm, and so I really and I don't know if all universities would have done this, but [institution] definitely opened up like how I could combine some of my most interesting things or my favorite umm topics-

Other examples showed that some students believed they were developing life skills that would help them after college, such as interpersonal skills, reasoning skills, time management skills, and decision-making skills. In addition to this broad range of skills, there were a few quotations showing how intercultural awareness and competencies were significant benefits the students received through their collegiate experiences. Students developed some particularly salient insights from the intersection of their curricular experiences and their intercultural views of the world. The following examples demonstrate this phenomenon.

Keisha was a first-year student at the time of her interview, and a nursing major. She had arbitrarily signed up for a course, “Perception of Social Justice: the 100-Year Korean American Experience” that became a significant experience for her. Her choice was somewhat arbitrary in that she needed to take a social science course during her freshman year and this was the only one that fit among her nursing classes. She describes the course as “the most awesomest class ever” because it provided her with information about racism in US history and how it gets overlooked in mainstream histories. The course provided information for students like Keisha to reconsider the histories familiar to them in light of diverse perspectives. While this knowledge component was central, Keisha also noted the way in which the course encouraged personal consideration of the materials discussed. “We just talk about race and how race has affected our lives, who we are, our racial identities, and how we view other people.” Through the course, Keisha was exposed to scholarly approaches to understanding the impact of race in history and was encouraged to integrate this understanding with her own experiences.

Keisha began to integrate her learning through connections with other coursework, namely her honors class on health disparity in policy and politics. In combining what she learned in the two courses, she began to conceive of the problem of health disparity, “a huge issue inside

and outside of nursing” as related to racism and as an intellectual problem. Keisha is no newcomer to racism; as an African-American high school student, certain other students claimed that her impressive college admissions were the sole result of “favoritist” affirmative action policies. Her transformative insight is not so much that health disparity exists as a result of systemic racism, but that academics are interested in it as a scholarly research problem. She observed: “Not that I didn’t see [they] were problems; I just didn’t know that it was seen as a problem.” Keisha now understands disparities in health as a problem of racism and as a scholarly problem; this orientation resulted from her exposure to the issue through her coursework. This new perspective was based not only on her own prior understanding of and experience with racism, but as a result of linking the content between two classes in the same term. Further, if the faculty teaching these courses were aware of the connections she was making here, she didn’t mention it, instead, she described this as something she did on her own.

Discussion and Implications

After considering the overlapping influences in students’ lives, it appears that diverse interactions, integrative assignments, and intercultural values and attitudes functioned as the qualities most likely to influence students’ integration of learning. The qualitative results emphasize how students were able to synthesize and organize ideas, information, and experiences into new, more complex interpretations and relationships, put together ideas and concepts from different courses, and make connections between their classes and out-of-class experiences.

Generally, these results are good news for educators, and confirm the value of current educational practices. As DeZure, et al. indicated, 37% of the institutions in their analysis focused on curricular integrative educational strategies. In our analysis, integrative assignments

had the largest effect size, and the most consistent effect across class years of any of the variables tested. Therefore, these results serve to confirm that campuses' tendencies to pursue curricular integration through assignments and exams are a productive strategy for promoting students' IL.

Practice Implications

Opportunities to engage in a diverse climate. The literature on integrative learning indicated that the use of multicultural learning experiences as intentional integrative strategies were seldom employed relative to other approaches (DeZure, et al.). Our quantitative and qualitative results suggest that diverse interactions are an extremely important part of promoting students' IL. Based on our analysis of factors influencing IL, students' intercultural values and attitudes stand out as a substantial and consistent covariate. In the qualitative data, students explained how class assignments and discussion on issues of diversity helped them make connections among their classes, as well as understand how these issues could be applicable in their personal lives. These findings support King and Baxter Magolda's (2005) integrative model of intercultural maturity, and showcase these factors empirically as reciprocal developmental outcomes. Consequently, institutions have another reason to be intentional about the extent to which the campus fosters a climate where students have an opportunity to engage in frequent multicultural interactions.

Household income. The negative effect of household income on students' integration of learning did not emerge as a significant predictor until the sophomore year, and remained as an influential predictor of IL throughout the upperclass years of college. It is possible that with the onset of the sophomore year, students take on more financial responsibility compared to their first year of college. As a result, students may be forced to think through the financial

implications of their choices more thoroughly. As finances garner more attention in the student's mind, one might engage in a type of tunnel vision that limits one's capacity for IL and incorporating many disparate (non-financial) issues. In order to assist students, colleges and universities should make sure that they can support students' emotional and psychological needs that result from financial stressors. Additionally, students may benefit from receiving priority placement for work-study or other campus employment that could be designed to support students in refocusing on curricular and disciplinary integration, such as research assistant activities. In sum, household income as a negative predictor of IL is important for two reasons: 1) it reinforces the extent to which economic factors influence student development and learning; and 2) it provides further evidence that institutions must be intentional about assisting students with financial aid packages that sustain them throughout college and not simply at the time of admission.

Sociocultural values. With reference to the junior year, students might be well positioned to become more thoughtful about their sociocultural values. Junior year often serves as a time where students are settling into their majors, and looking ahead to an internship or job in the summer that might help them with a post-college career. Some juniors begin to think about graduate school options and applications. As the students were surveyed in the mid to later part of the school year, it is likely that future career and professional plans were weighing on students' minds. The sociocultural values factor measured students' views about their role in society, and the extent to which it coincided with cultural values such as promoting racial understanding, attending to political affairs, being a leader in the community, and improving how one understands of other cultures. As students immerse themselves in their majors and explore future post-college options, it is likely that they end up spending more time contemplating their

sociocultural values. In doing so, students are prompted to synthesize and condense their educational, experiential, and personal insights into a more integrated view.

The main effects, interaction effects, and individual class year effects considered in concert suggest interesting implications for educational practice. For instance, there was an interaction effect between learning community participation and diversity interventions. Interestingly however, when sub-divided by class year, the effect of learning community participation had a prominent influence on IL only during the junior year. Similarly, diversity interventions had little noticeable effect during the junior year. Moreover, it might serve students particularly well to capitalize on the interaction of these factors, and to target the junior year specifically with more programmatic opportunities for both learning community participation and an increased frequency of diversity interventions.

Seminars as integrative learning. DeZure, et al.'s (2005) work indicated that educators have been using first year seminar programs as a primary approach for helping students to integrate their learning. Essentially, our analysis suggests that such a strategy may be a misplaced approach. Furthermore, our qualitative data didn't provide any particular emphasis on this educational practice. Moreover, first year seminars may facilitate other important developmental outcomes beyond IL. However, attributing or justifying the implementation of a first year seminar based on its value as an activity that fosters IL appears to be somewhat misguided or overzealous.

Conclusion

The integration of learning is an important developmental outcome for student growth during college. This study represents two methods for conceptualizing and assessing the

integration of learning, and serves as an important step forward in understanding how integrated learning manifests itself through the college experience.

Our quantitative analysis demonstrated that students' proclivity for IL changes and strengthens over time and across class years. The qualitative data largely supported this conclusion, in that the majority of information rich cases demonstrating the integration of learning came from seniors. At the same time, both the quantitative and qualitative data suggested that students' background characteristics and values had very little influence on their IL (with the notable exception of a negative relationship with household income in the sophomore year). In other words, regardless of who students were, they had the ability to integrate their learning. Most interesting was the finding that within the diverse set of the four universities, institutional type did not have a statistical effect on IL; and by extension, one might presume that students' aptitude for IL is not limited by institutional resources or reputation.

Limitations. The analyses we have presented was based on pilot data, and due to sampling limitations, are limited in their generalizability and transferability. Future analyses should attempt to replicate these findings to ensure their accuracy. However, this analysis can be used as an appropriate tool for prompting college educators to reconsider some of their assumptions about suitable curricular, co-curricular, and experiential learning activities for facilitating students' integration of learning.

The data on educational level were mixed. Although the integration of learning did occur in earlier educational levels (as shown in the qualitative data), the quantitative data suggests students' processes of acquiring the capacity for IL changed and strengthened over time and across class years. As shown in both the quantitative and qualitative data, meaningful course assignments and interactions with diversity contributed to more integrated learning.

Due to the difficulty and complexities involved, mixed method studies are relatively rare. By adjoining quantitative and qualitative approaches, a more holistic picture of students' meaningful experiences comes into focus. In a very real sense, the disparate pieces become richly integrated, providing insights that transcend traditional methods.

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Table 1

Descriptive Differences Across Class Year for Analysis of Integration of Learning (N=723)

Variable	First Year	Sophomore	Junior	Senior	Overall
Integration of Learning ^a	-0.34	0.08	0.17	0.37	0.00 ***
Background Characteristics					
Gender ^b (female) (N=714)	67.30 %	69.70 %	59.20 %	60.00 %	66.90 %
Minority Status ^b (N=712)	22.90 %	17.10 %	18.40 %	19.80 %	19.80 %
Household Income ^a	3.32	3.12	3.35	3.36	3.36
Pre-College Ability ^a	-0.10	-0.10	0.19	0.19	0.00 **
Collegiate Experiences					
College Grades	5.57	5.72	5.88	5.95	5.74 **
Credit Years	1.54	2.89	3.85	4.80	2.93 ***
Study Abroad ^b	1.20 %	2.80 %	6.30 %	20.60 %	6.00 %***
Total Hours Worked	8.69	13.17	11.10	11.62	10.99 ***
Hours Volunteered per Week ^a	1.53	1.48	1.61	1.70	1.56 *
Participated in Learning Community ^b (N=720)	18.50 %	20.10 %	19.70 %	22.40 %	19.90 %
Participated in a Living & Learning Community ^b (N=720)	11.30 %	12.80 %	11.00 %	18.10 %	12.90 %
Participated in an Internship ^b (N=720)	3.60 %	12.80 %	24.60 %	58.30 %	19.70 %***
Participated in a First Year Seminar ^b (N=716)	48.60 %	47.70 %	57.10 %	62.20 %	52.20 %*
Participated in a Senior Seminar ^b (N=716)	0.80 %	0.90 %	6.30 %	29.90 %	7.00 %***
Diversity Interactions	-0.14	0.06	0.05	0.33	0.00 ***
Integrative Assignments	-0.20	0.02	0.06	0.29	0.00 ***
Intercultural Values & Attitudes	-0.04	0.03	0.03	-0.01	0.00
Sociocultural Values	-0.06	-0.05	0.06	0.14	0.00

*-p ≤ .10, *p ≤ .05; **p ≤ .01, ***p ≤ .001*

a. Continuous variables are standardized (M=0, SD=1). b. Categorical variables. Differences tested with crosstabulations.

Notes: All variables have N=723 cases, unless otherwise noted. Group differences for continuous variables were tested with ANOVA tests

Table 2

Regression Model Investigating Interactions with Covariates in Analysis of College Students Integration of Learning

Variable	Model 1: Background Controls	Model 2: Main Effects	Model 3: Interaction Effects
	<i>b</i>	<i>b</i>	<i>b</i>
Gender (female)	-0.021	-0.041	-0.022
Minority Status	0.126	0.049	0.031
Household Income	-0.053	-0.101 ***	-0.106 ***
Pre-College Ability	0.125 **	0.063 ~	0.016
Institution Attended	0.030	-0.053 ~	-0.048
Class Year		0.469 **	0.454 **
Quadratic Class Year		-0.353 *	-0.347 *
College Grades		0.012	-0.001
Credit Yearsa		0.019	0.021
Study Abroad		0.108	0.002
Total Hours Worked		-0.014	0.003
Hours Volunteered per Week		0.019	0.046
Participated in Learning Community		0.176 *	0.185 *
Participated in a Living & Learning Community		-0.137	-0.173 ~
Participated in an Internship		0.024	0.054
Participated in a First Year Seminar		-0.058	-0.094
Participated in a Senior Seminar		0.061	0.058
Diverse Interactions		0.212 ***	0.167 ***
Integrative Assignments		0.427 ***	0.522 ***
Sociocultural Values		0.065 ~	0.071 *
Intercultural Values & Attitudes		0.125 ***	0.125 ***
Learning Comm. X Hours Worked			-0.154 *
First Year Sem. X Pre-College Ability			0.145 *
First Year Sem. X Integrative Assignments			-0.178 **
Learning Comm. X Diverse Interactions			0.131 ~
Study Abroad X Diverse Interactions.			0.281 *
Grades X Intercultural Values & Att.			-0.099 **
Grades X Sociocultural Purpose			0.080 *
Internship X Volunteer Hours			-0.138 *
Constant	-0.011	0.016	0.026
R ²	0.020 *	0.459 ***	0.493 ***
ΔR ²	0.020	0.439 ***	0.035 ***

~*p* ≤ .10, **p* ≤ .05; ***p* ≤ .01, ****p* ≤ .001

Note: coefficients are *b* values

Table 3

Regression Model Testing the Contrasts of Class Year on College Students' Integration of Learning

Variable	Model	Model
	<i>b</i>	<i>b</i>
First Year v. Sophomore, Junior, & Senior Years	-0.420 ***	-0.272 **
First & Sophomore Years v. Junior & Senior Years	-0.089	-0.029
First, Sophomore, & Junior Years v. Senior Year	0.203 ~	0.038
Gender (female)		-0.046
Minority Status		0.050
Household Income		-0.102 ***
Pre-College Ability		0.063 ~
Institution Attended		-0.049
College Grades		0.011
Credit Years		0.017
Study Abroad		0.107
Total Hours Worked		-0.015
Hours Volunteered per Week		0.02
Participated in Learning Community		0.178 *
Participated in a Living & Learning Community		-0.143
Participated in an Internship		0.021
Participated in a First Year Seminar		-0.056
Participated in a Senior Seminar		0.055
Diverse Interactions		0.211 ***
Integrative Assignments		0.426 ***
Sociocultural Values		0.066 *
Intercultural Values & Attitudes		0.126 ***
Constant	0.163 ~	0.125
R ²	0.071 ***	0.459 ***
ΔR ²	0.071 ***	0.388 ***

~*p* ≤ .10, **p* ≤ .05; ***p* ≤ .01, ****p* ≤ .001

Note: coefficients are *b* values

Table 4

Comparison of Class Year Main Effects of Covariates Influencing College Students' Integration of Learning

Variables	Freshman (N=249)	Sophomore (N=220)	Junior (N=127)	Senior (N=127)
	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>
Gender (female)	-0.170	0.040	0.087	-0.050
Minority Status	0.012	0.055	-0.053	0.093
Household Income	-0.027	-0.166 **	-0.196 **	-0.133 *
Pre-College Ability	0.053	0.082	0.048	0.054
College Grades	-0.011	0.018	0.100	0.053
Credit Years	-0.016	-0.029	0.065	0.097
Institution Attended	0.006	-0.103 ~	-0.042	-0.041
Study Abroad	0.661	-0.440	0.329	0.058
Total Hours Worked	0.005	0.008	-0.008	-0.108
Hours Volunteered per Week	0.080	0.066	-0.030	-0.109
Participated in Learning Community	0.046	0.169	0.480 *	0.014
Participated in a Living & Learning Community	-0.147	-0.020	-0.384	-0.080
Participated in an Internship	-0.059	0.142	0.125	-0.042
Participated in a First Year Seminar	-0.012	-0.107	-0.236	0.096
Participated in a Senior Seminar	-0.079	-0.163	-0.131	0.025
Diverse Interactions	0.164 *	0.245 ***	0.186 *	0.351 ***
Integrative Assignments	0.445 ***	0.469 ***	0.475 ***	0.234 ***
Sociocultural Values	0.030	0.007	0.202 *	0.030
Intercultural Values & Attitudes	0.165 *	0.218 ***	-0.111	0.173 *
Constant	-0.109	0.023	0.064	0.078
R ²	0.420 ***	0.510 ***	0.460 ***	0.483 ***

~ $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Note: coefficients are *b* values

Differences of Class Year on College Students' Integration of Learning

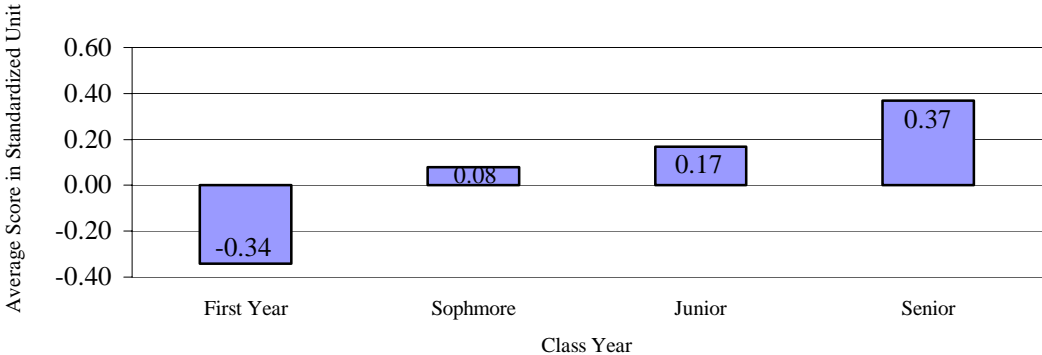


Figure 1. One-way ANOVA of Class Year on Integration of Learning
Note: $F_{(3, 718)} = 18.24, p \leq .001,$

Figure 2. Interaction Effects of Learning Community & Diverse Interactions on Students' Integration of Learning

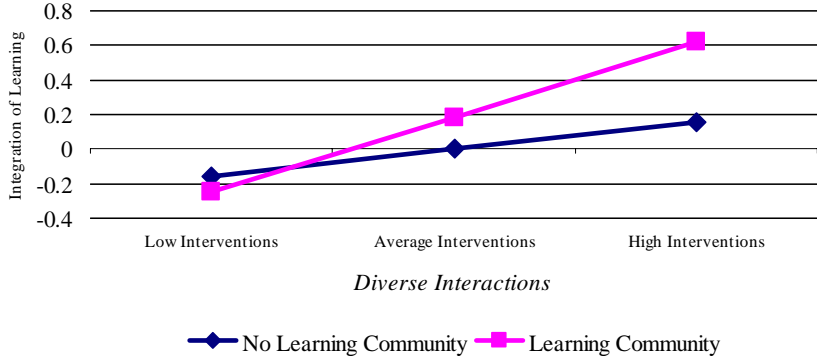


Figure 3. Interaction Effects of Learning Community & Hours Worked on Students Integration of Learning

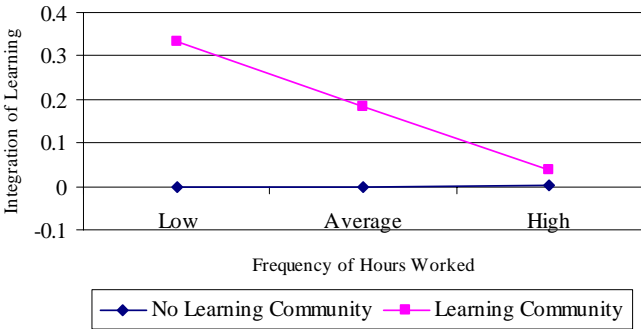


Figure 4. Interaction Effects of First Year Seminar & Pre-College Academic Ability on Students' Integration of Learning

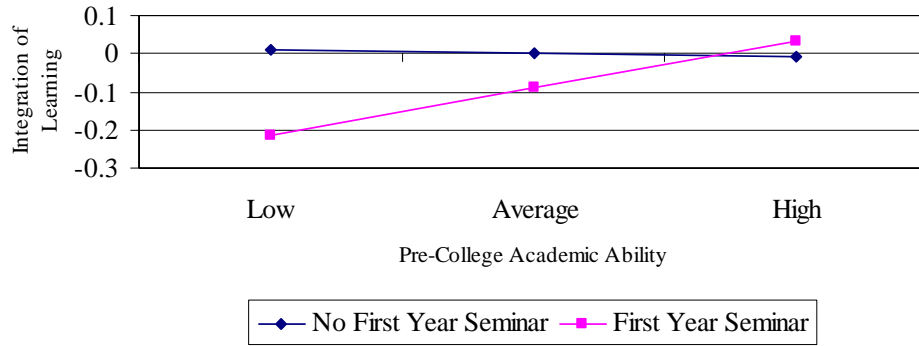
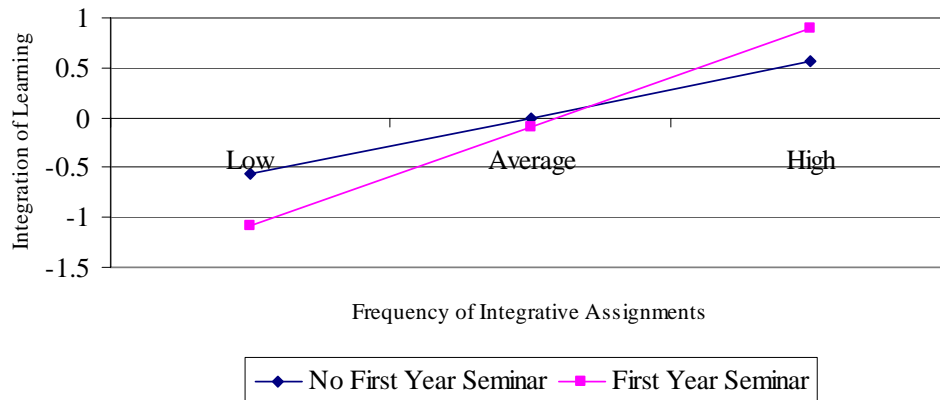


Figure 5. Interaction Effects of First Year Seminar & Integrative Assignments on Students Integration of Learning



Appendix

*Factor Loadings & Reliability Ratings for Factors Used in Analysis of Integration of Learning in College***Factor: Integration of Learning***($\alpha = .744$, Eigenvalue = 2.78, 39.995% of total variance explained)*

Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships	0.213
Frequency with which you have worked on a paper or project that required integrating ideas and information from various sources	0.247
Frequency with which you have put together ideas or concepts from different courses when completing assignments or during class discussions	0.273
Frequency with which you have put together ideas from your readings or classes with students, family members, coworkers, etc., outside of class	0.246
My out-of class experiences have helped me to connect what I have learned in the classroom with life events	0.208
Courses have helped me to understand in historical, political, and social connections of past events	0.198
Exams or assignments require me to use course content to address a problem not presented in the course	0.183

Factor: Sociocultural Values*($\alpha = .783$, Eigenvalue = 2.89, 48.13% of total variance explained)*

Importance of influencing political structures	0.256
Importance of influencing social values	0.245
Importance of promoting racial understanding	0.229
Importance of keeping abreast of political affairs	0.250
Importance of becoming a leader in the community	0.224
Importance of improving one's understanding of other cultures and countries	0.237

Appendix continued . . .

Appendix continued . . .

Factor: Intercultural Values & Attitudes*($\alpha = .827$, Eigenvalue = 2.967, 59.349% of total variance explained)*

I enjoy having discussions with people whose ideas and values are different from my own	0.226
The real value of a college education lies in being introduced to different values	0.258
I enjoy talking with people who have values different from mine because it helps me better understand myself and my values	0.266
Learning about people from different cultures is a very important part of my college education	0.273
Contact with individuals whose backgrounds are different from my own is an essential part of my college education	0.272

Factor: Integrative Assignments*($\alpha = .821$, Eigenvalue = 2.212, 73.741% of total variance explained)*

Exams or assignments require student to compare or contrast topics or ideas from a course	0.360
Exams or assignments require student to point out the strengths and weaknesses of a particular argument or point of view	0.414
Exams or assignments require student to argue for or against a particular point of view and defend an argument	0.389

Factor: Diverse Interactions*($\alpha = .883$, Eigenvalue = 3.81, 63.57% of total variance explained)*

Frequency of serious conversations with students of a different race or ethnicity	0.177
Frequency of serious discussions with other students about different lifestyles and customs	0.216
Frequency of serious discussions with other students about major social issues such as racial, diversity, human rights, equality or justice	0.218
Frequency of serious discussions with students with different religions	0.218
Frequency of serious discussions with students with different philosophy of life or personal values	0.217
Frequency of serious discussions with students of different political opinions	0.206

¹ This seven liberal arts outcomes of the WNSALE project are: (1) effective reasoning and problem solving, (2) intercultural maturity, (3) integration of learning, (4) moral reasoning and behavior, (5) well-being, (6) leadership, and (7) inclination to inquire and lifelong learning (NSLAE, 2003).