The Impact of Non-Academic Involvement on Higher Order Thinking Skills

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ABSTRACT

External and internal stakeholders in higher education are asking for accountability about what takes place in the classroom (Alexander, Clinton, & Kean, 1986; Hart Research Associates, 2010; Spellings, 2006). They want to be assured that the learning institutions claim is occurring on campus is in fact happening (Alexander, 2000). In response, academic leaders have produced information about active learning strategies in classrooms (Seifert, Pascarella, Wolniak, & Cruce, 2006; Tsui, 2002; Umbach & Wawrzynski, 2005), student approaches to learning (Biggs, Kember, & Leung, 2001), and faculty-student interaction that lead to increased use of higher order thinking skills (Kuh, 1995; Pascarella & Terenzini, 1991; Reason, Terenzini & Domingo, 2007).

Although there is extensive literature on learning that occurs in academic settings on college campuses, data on whether students are engaging in higher order thinking skills in non-academic settings are less prevalent. This study sought to understand whether students’ higher order thinking skills (HOTs) are influenced by their involvement in non-academic activities (NAIs).

I analyzed data from college seniors who completed the 2010 National Survey of Student Engagement (NSSE) to address two questions. First, I explored what factors emerged from the items about non-academic involvement (NAI) on the NSSE. Second, multiple regression models were employed to determine the extent to which variance in HOTs could be explained by these NAI factors.

There were 14 items on the 2010 NSSE that, based on literature, measured frequency with which students engaged in NAIs. Exploratory factor analysis revealed two independent factors consisting of 7 items: Relationships (3 items) and Diverse Perspectives (4 items). These two factors explained 21% of variance in students’ higher order thinking skills. Students who are exposed to diversity and develop close relationships use HOT skills more frequently. This suggests implications for those who work in admissions, student affairs, and human resources, among others. The findings also inform policies related to promotion and tenure as well as student involvement.
DEDICATION

This dissertation and doctoral program is dedicated to the memory of thirty-two men and women who lost their lives and in honor of the twenty-six students who were physically injured in the senseless acts of violence at Virginia Tech on April 16, 2007.
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He will not remember the days of my work on my degree. But, like the girls, I hope to instill in
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Chapter One
Introduction

Calls for accountability about student learning in higher education are increasing in frequency and tenor. The debate implies that colleges and universities would not address student learning if external calls for accountability did not exist (Blaich & Wise, 2011). In addition, with state resources at a premium, government officials are interested in how public institutions of higher education are using the monies allocated to them to benefit students and their educational endeavors (Alexander, 2000). At the same time, institutions of higher education are interested in articulating student learning to demonstrate a commitment to their mission and established educational standards (Kuh & Ikenberry, 2009, October). In general, it behooves institutions of higher education to respond to these stakeholders in order to communicate that student learning is taking place and taxpayer investment in higher education is a worthwhile outlay.

External stakeholders include government entities such as federal and state legislatures and departments of education, in addition to employers. The federal government’s interest is tied primarily to financial aid for students. In a report by the Secretary of Education’s Commission on the Future of Higher Education (also known as the Spellings Commission), experts proposed incentives for campuses that adopt standardized testing for purposes of making higher education accountable to consumers. In the words of the Commission, “We believe that improved accountability is vital to ensuring the success of all the …reforms we propose…” (Spellings, 2006, p. 4). The Commission’s recommendations represent what was the first skirmish in a campaign to bring greater accountability to higher education.

State legislators represent a second constituency with a vested interest in the accountability of postsecondary education. This interest also is largely tied to money. However, state funds typically provide broad institutional support rather than focusing on financial aid. In 1986 the National Governor’s Association embraced assessment in higher education in a report aptly entitled Time for Results. A key figure in this initiative was then Governor John Ashcroft of Missouri, whose state motto, “Show Me,” captured the tone of policy makers seeking accountability because they were tired of what they perceived as higher education’s sense of entitlement (Alexander, Clinton, & Kean, 1986).

Employers are the final group of external stakeholders calling on higher education to ensure certain outcomes for students. The American Association of Colleges & Universities
(AAC&U) has conducted several surveys of human resource officers regarding the quality of newly hired college graduates. In 2009, only about one-quarter of employers believed that colleges were doing a good job of preparing students for challenges facing the modern workforce. One in five believed that significant improvements were needed in both two-year and four-year colleges’ performance. Two years later, with the state of economy in more dire straits, the AAC&U commissioned another study of employers’ views on student learning in college. Results revealed that employers need future employees to be versatile in their knowledge and skills in order to be most effective in the work force (Hart Research Associates, 2010).

In addition to external stakeholders, there are two key groups of internal stakeholders also calling for institutions of higher education to be accountable for student learning: students and their parents. Undergraduate students are demanding that they have opportunities in learning, research, and service in the community. They want to be sure that the institution of higher education they attend will provide the academic resources and extracurricular activities they were told during the college search process would be available to them (Meredith, 2004). Measures of accountability that are important to students include rankings like those found in *U.S. News & World Report*. On one hand, students want to know how the colleges and universities they are interested in attending measure up nationally (Meredith, 2004). Ironically, on the other hand, students actually provide much of the data on which those rankings are based by participating in surveys during their college career that determine the degree to which they are achieving established learning outcomes.

The second group of internal stakeholders includes parents of college students. Students today take cues from their parents more so than their counterparts from previous generations (Howe & Strauss, 2007). The Millennial and Y generations of students now enrolled in college also tell their parents more about their personal lives than previous generations (Howe & Strauss, 2007). Parents are asking questions of university officials about their child’s academic progress. Given their concerns about the current economy, parents want to be sure their children are being prepared for either employment or graduate school. To that end, they are educating their students on what to expect from a college education. Throughout students’ lives their parents have held schools accountable for having high learning standards and they expect those same high standards from their student’s college (Downing, 2006).
These calls for accountability from external stakeholders coupled with calls from internal groups like parents and students highlight the need for institutions of higher education to measure outcomes at the individual and institutional level. There may be benefits to having a common set of learning outcomes that apply to all students thereby providing an understanding of the overall learning that takes place on campus. In addition, student learning outcomes that are typically a combination of institution-wide and program-level assessment measures provide dynamic feedback to faculty and staff.

Traditional wisdom holds that faculty members must be the central figures in the assessment process (Hart Research Associates, 2010). Chief academic officers believe that faculty engagement is the key component to improving assessment of student learning outcomes (Kuh & Ikenberry, 2009, October). A set of principals developed under the sponsorship of the American Association for Higher Education (AAHE) points in the same direction, urging that assessment be firmly connected to the classroom and the values of educators (Astin, 1993). Institutions of higher education have embraced faculty involvement in assessment and have offered training to faculty on the topic of assessment. Not only should faculty members be involved in the assessment process, they should be providing the leadership for that process, say experts (Eaton, 2008). Moreover, there needs to be congruence between teaching and learning in the classroom. In fact, the real promise of assessment—and the area in which faculty involvement matters most—lies precisely in the questions that faculty ask about their students’ learning: what purposes and goals are most important, are those goals met, and how can I better facilitate student learning (Hutchings, 2010).

Teaching and assessment practices impact what and how students learn. Outcomes assessment data inform institutions of higher education about the quality of learning occurring on campus (Biggs, 1996). At the individual level, outcomes are concerned with the degree to which students achieve class-specific outcomes. At the institutional level, however, campuses are concerned with students’ overall development, particularly the development of higher order thinking skills.

Higher order thinking (HOT) occurs when learners integrate new information into what they already know in order to answer questions that may be perplexing (Lewis & Smith, 1993). Bloom’s Taxonomy (Bloom, Krathwohl, & Masia, 1956) is one early structure for assessing levels of learning. The taxonomy describes a range of learning from the most simplistic that
involves recalling and reproducing information to the highest level of learning (evaluation) in which students can make decisions based on known information and support judgments with facts and figures (Athanassiou, McNett, & Harvey, 2003). The taxonomy helps explain how students practice higher order thinking skills such as critical thinking, analyzing, and synthesizing information. It has served as a foundational model for researchers to understand student learning both in and out of the classroom.

Inside the classroom, students can strive to achieve higher order thinking skills through three specific strategies: (1) active learning; (2) their approaches to learning; (3) and their interaction with faculty. The first key strategy for student engagement in higher order thinking skills is engagement in active learning such as revisions to their writing, interactive classroom discussions, and cross discipline learning techniques. (Seifert, Pascarella, Wolniak, & Cruce, 2006; Tsui, 2002; Umbach & Wawrzynski, 2005). The classroom environment is one strategy to develop higher order thinking skills.

A second strategy involves students’ approach to learning. Students’ motivation can be extrinsically or intrinsically based as described by the Student Approaches to Learning theory (Marton & Säljö, 1976). If students are motivated by an internal reason, such as a self-described desire to learn, they are more likely to learn at a deeper level. On the other hand, if students sense that they are being asked to understand a topic through memorization or by rote, then they are more apt to learn at a surface level (Biggs, Kember, & Leung, 2001). In the late 1990s, Biggs (1993) began to refer to these forms of learning as “surface” and “deep” processing. The language may have changed over the years, however, the key to educational excellence lies not in the memorization of vast amounts of information but rather in fostering habits of mind that enable students to deepen their learning, engage new questions, and reach informed judgments (Kuh, Chen, & Nelson Laird, 2007).

The third strategy that promotes the development of higher order thinking skills is student interaction with faculty. Any type of interaction with faculty is a predictor for student intellectual and academic development (Kuh, 1995; Pascarella & Terenzini, 1991; Reason, Terenzini & Domingo, 2007). Students who only see their faculty during office hours to review homework or prepare for a test are less likely to develop critical thinking skills due to the more task-focused purpose of the interaction (Cotten & Wilson, 2006). Upper division students may have more opportunity for informal interaction with their faculty whether through research activities or over
group dinners that contribute to development of higher order thinking skills (Plecha, 2002, April). Students’ learning, no matter whether through active learning strategies, their approaches to learning, or interaction with faculty is well documented in the classroom.

However, students also learn from out-of-classroom experiences. For purposes of this study, student learning outside the classroom is referred to as non-academic forms of student-involvement (NAIs). NAIs are defined as participation in co-curricular life, including activities such as membership and leadership in student clubs and organizations, participation in student activities and residence life programs, religious and spiritual based programs, and multicultural activities, to name a few. There is a great deal of research on the outcomes associated with different NAIs. For example, students who participate in leadership activities on campus, such as leading clubs and organizations, develop a greater sense of self-confidence (Cress, Astin, Zimmerman-Oster, & Burkhardt, 2001; Day, 2001). Student government leaders are more likely to demonstrate a greater sense of competence and purpose (Martin, 2000; Miles 2011) and character development through political activism (Misa, Anderson, & Yamamura, 2005).

Other work has explored outcomes students achieve when they are active in religious and civic activities as undergraduates. Theses NAIs lead to self-understanding (Astin & Antonio, 2004), and civic engagement (Verba, Schlozman, & Brady, 1995; Vogelgesang & Astin, 2005, April). Students who participate in religious and civic activities also have a greater sense of belonging and satisfaction in college (Cheng, 2004).

Relationships with peers are a third form of NAI that has garnered extensive attention in the literature with respect to outcomes. Positive peer relationships lead to a sense of competence and purpose achieved through community activities (Martin, 2000). These interactions promote conversations where students examine their personal beliefs (Astin, & Antonio, 2004; Guarasci & Cornwell, 1997). Like those who participate in religious and civic activities, students who engage more frequently with peers are more likely to have a strong sense of satisfaction with their college experience (Astin, 1993). Collectively, friendships and involvement on campus contribute to students’ sense of belonging (Cheng, 2004).

Finally, student involvement in multicultural programs and interactions with peers from different ethnic and religious backgrounds lead to yet other outcomes. Such students are more likely to get involved in political activism leading to moral awareness and interpersonal development (Misa, et al., 2005). Furthermore, when students engage in intercultural dialogue
they achieve another outcome: they are more likely to have better understanding of others’ beliefs and perspectives and that enhances their own cultural awareness (Gurin, Dey, Hurtado, & Gurin, 2002).

Overall, there is a wealth of research on NAIs and the outcomes students achieve when they participate in NAIs. Less evident in the literature is whether individual NAIs (e.g., leadership, engagement in religious activities) can be grouped together to create factors of involvement that may then be associated with out-of-class student outcomes. Additionally, there is little research on the connection between NAIs and the outcome of HOT.

Indeed, in order to better understand outcomes related to both in- and out-of classroom learning, postsecondary institutions collect data. Three common external measures of student outcomes include the Collegiate Learning Assessment (CLA), the College Student Experiences Questionnaire (CSEQ), and the National Survey for Student Engagement (NSSE). The CLA is a survey that aims to understand the impact of pedagogy – teaching – on learning at institutions of higher education. The survey assumes faculty play the central role in student learning and is designed to understand how students achieve higher order learning skills (Council for Aid to Education, n.d.). Another common instrument that measures student learning is the CSEQ. This survey was designed to measure satisfaction with the collegiate experience and focuses on student engagement in activities that benefits learning and development (The College Student Experiences Questionnaire Assessment Program, 2014).

The third common external measure of student outcomes, and the one most relevant to my study, is the NSSE. The NSSE yields data related to both higher order thinking and student engagement. It includes items that measure students’ perceptions of whether they are engaged in higher order thinking skills (HOTs) based on Bloom’s Taxonomy (Laird, Schoup, & Kuh, 2005, May). The instrument also measures non-academic involvement to better understand students’ perceptions of their college experiences. The survey is administered at postsecondary institutions across the country.

**Statement of the Problem**

In summary, external and internal stakeholders have called for increased accountability from higher education (Blaich & Wise, 2011; Kuh & Ikenberry, 2009, October). External agencies at both the federal and state level are interested in institutional accountability (Alexander, 2000; Spellings Commission, 2006). Employers are expecting college graduates to
be prepared to enter the work force ready to handle complex tasks (Hart Research Associates, 2010). Internal stakeholders, consisting of students and their parents, want assurances that attending college means students have learned academic material and are prepared to enter the job market or enroll in graduate education (Downing, 2006; Howe & Strauss, 2007; Meredith, 2004).

In order to address calls from the external and internal stakeholders, institutions of higher education are assessing learning. The assessment process includes measuring learning outcomes at the institutional and individual level. Faculty members are key figures in assessing the individual level of learning taking place in the classroom. Students learn through active learning strategies (Seifert, Pascarella, Wolniak, & Cauce, 2006; Tsui, 2002; Umbach & Wawrzynski, 2005), their approaches to learning (Biggs, Kember, & Leung, 2001; Kuh, Chen, & Laird, 2007) and by interacting with faculty (Kuh, 1995; Pascarella & Terenzini, 1991; Reason, Terenzini, & Domingo, 2007). These data inform the degree to which students may be achieving higher order thinking skills (Bresciani, Gardner, & Hickmott, 2010). The development of higher order thinking skills is part of the overall mission of most institutions.

However, students learn not only in the classroom but also outside the classroom through NAIs. The literature on NAIs has typically involved an examination of the outcomes associated with a particular type of activity. For example, leadership activities lead to greater sense of self-confidence (Cress, Astin, Zimmerman-Oster, & Burkhardt, 2001; Day, 2001), competence and purpose, (Martin, 2000; Miles 2011) and political activism (Misa, Anderson, & Yamamura, 2005). Participating in religious and civic activities leads to self understanding (Astin & Antonio, 2004) civic engagement (Verba, Schlozman, & Brady, 1995; Vogelgesang & Astin, 2005, April) and belonging and self satisfaction (Cheng, 2004) while students who have positive relationships with their peers develop a sense of competence and purpose through community activities (Martin, 2000) and promote conversations with peers resulting in students’ examination of their personal beliefs (Astin, & Antonio, 2004; Guarasci & Cornwell, 1997). Furthermore, students who get involved in multicultural programs, events, and friendships are more likely to get involved in political activism leading to stronger moral awareness and personal development (Misa, et al., 2005) and the intercultural group dialogue leads to better understanding of their own beliefs (Gurin, Dey, Hurtado, & Gurin, 2002).
However, there are two important gaps in the literature on HOTs and NAIs. First, no work has been done on whether NAIs can be grouped into factors and subsequently associated with certain outcomes. Second, there is no literature on whether NAIs are associated with the outcome of higher order thinking. The NSSE collects data on both HOTs and NAIs (Kuh 2001; 2009). My study used NSSE data to address both these gaps in the body of work on outcomes that students achieve in college.

**Purpose Statement**

The purpose of this study was two-fold. The first was to test whether non-academic involvement factors emerged from NSSE data. I used the literature to identify NAIs that lead to positive outcomes among college students. I then identified items on the NSSE that reflected those NAIs and conducted exploratory factor analysis to see if items could be clustered into factors. The second purpose was to explore whether these factors explained variance in HOT skills. The conceptual framework for understanding HOT skills was a modified version of Bloom’s Taxonomy (1956) that described thinking as a progression of six skills building in complexity from acquiring knowledge through comprehension, application, analysis, and synthesis, to evaluation. For purposes of this study, I used participants’ responses on the NSSE to an item that measures the frequency with which they use analyzing, synthesizing, making judgments, and applying skills in the past year to create a composite score for HOT.

The NSSE is administered to first year and senior students at institutions of higher education across the U.S. to capture participants’ self-reported college experiences both in and out of the classroom. The data for my study came from a sample comprised of 2,000 full-time degree-seeking seniors who were native to their institution and who had completed the NSSE in spring 2010.

**Research Questions**

This study was designed to address the following research questions:

1. What independent factors are measured by items on the NSSE related to NAIs?
2. How much of the variance in HOT is accounted for by the extracted NAI factors?

**Significance of the Study**

This study was significant for key campus constituencies including mid-level student affairs administrators, chief student affairs officers, and students. To start, the results from this study provided mid-level student affairs administrators with a better understanding of whether
non-academic activities are associated with higher order thinking skills. Mid-level student affairs administrators might use the results to design programs and services that are more likely to lead to HOTs.

The second campus group that might find the study results useful included chief student affairs officers. The results from this study provided this group with data about whether NAIs can be grouped into factors. Chief student affairs might use this information when discussing the contributions of the division of student affairs to their institution’s academic mission.

The third campus group that might find the results useful was students. The study offered them information about types of NAIs and whether those NAIs were associated with HOTs. Students might use the results to select NAIs to engage in during their college career.

The present study also had significance for future research. For example, my study did not explore how the relationship between non-academic activities and higher order thinking was influenced by demographic characteristics. A future study might include demographic characteristics as independent variables. Likewise, my study included only four levels of thinking from Bloom’s Taxonomy. A future study could explore whether NAIs are associated with all levels of thinking skills described in that model. Additionally, the present study was quantitative in nature. Future studies might examine student learning through a qualitative methodology. Researchers could conduct focus groups and follow-up interviews with students to more richly understand how their involvement in campus life influences their thinking skills.

Finally, this study was significant for future policy. The findings might influence campus policies about student life. The results offered information about whether non-academic activities are associated with higher order thinking. This might influence policies that guide student participation in co-curricular activities. For example, it may be prudent for policymakers to revisit diversity-related policies if the results suggest that diversity-awareness activities influence HOTs. The same would be true for policies related to NAIs involving, civic-engagement activities and work experiences. Finally, the results might influence policies about learning outside the classroom.

**Delimitations**

As with all research, the present study had some initial delimitations. The first dealt with the sample. All the participants in this study were senior students. Therefore, this study should not be generalized to the entire student body, only the senior class. I defined higher order
thinking as a composite score of four items on the NSSE that measured HOT. It is possible that
the items on the NSSE did not adequately measure HOT. If that occurred, the results of the study
might have been influenced in some unforeseen manner. In addition, this study used data from
the NSSE instrument. There is a possibility that the NSSE did not include all NAIs that might be
associated with HOTs. This study was limited by the items on the instrument. Finally, it is
important to note that most testing on the reliability and validity of the NSSE instrument has
been conducted by NSSE staff. Consequently, some scholars have urged caution when
considering the applicability of NSSE data (Lutz & Culver, 2010). The results should be
interpreted in that context.

Organization of the Study

I organized the study around five chapters. The first chapter introduced the topic of the
study, the purpose statement, research questions, and significance of the study. Chapter Two
reviews the literature relevant to the study. The third chapter describes the methodology
employed in the study, including sample selection, data collection procedures, and data analysis
techniques. The results of the study are reported in Chapter Four. The final chapter discusses
those results and their implications for future practice, research and policy.
Chapter Two

Literature Review

This study was designed to examine involvement in non-academic activities and higher order thinking skills among college students. Specifically, I was interested in whether NAIs could be grouped into factors and, if so, whether those factors explained the variance in students’ higher order thinking skills.

Two bodies of literature were pertinent to the study. The first examined the activities that lead to the outcome of higher order thinking skills. Three sub-categories of studies emerged: active learning, student approaches to learning, and faculty-student interactions. The second body of research I examined was on outcomes that result from non-academic involvement on college campuses. This was important as I wanted to know if NAIs were associated with HOT skills. I identified five outcomes in the literature on NAIs, none of which related to HOT: (1) understanding of self, including self-confidence; (2) sense of competence and purpose; (3) character development; (4) examination of personal beliefs and perspectives; and (5) sense of satisfaction. This literature review is organized around these two major categories and their respective subtopics.

Outcomes that Lead to Higher Order Thinking Skills

The literature pertaining to higher order thinking skills predominately examines students’ experiences in academically related activities. Three major areas of research focus on what leads students to engage in higher order thinking skills: active learning strategies, approaches to learning, and faculty-student interactions.

Research on Active Learning

The research on active learning relates to two outcomes associated with higher order thinking: critical thinking and student engagement. Students who exhibit critical thinking skills are involved in courses where faculty create an active learning environment. Active learning in the classroom leads to improved learning (of course content) and development (of problem solving skills), qualities related to critical thinking (Mariskind, 2013; Murray & Lang, 1997; Seifert, Pascarella, Wolniak, & Cruce, 2006; Stage, Muller, & Kinzie, 1998). Many of the studies on active learning have been quantitative (Murray & Lang, 1997; Seifert, Pascarella, Wolniak, & Cruce, 2006; Stage, Muller, & Kinzie, 1998; Umbach & Wawrzynski, 2005; Whitmire, 1998), relying heavily on students’ self-reported gains. In qualitative work, students exhibit critical
thinking skills when they are involved in nontraditional pedagogical approaches to learning, such as comprehensive writing assignments requiring several drafts of papers and discussion-based classroom learning (Tsui, 2002).

Students also benefit from high impact faculty practices that encourage academic engagement and, in turn, higher order thinking. Examples of effective practices include frequent interactions with students, higher levels of academic challenge, and greater use of active and collaborative learning strategies (Umbach & Wawrzynski, 2005). Furthermore, course-related interactions between faculty and students result in students feeling more challenged and engaged in their learning activities (Umbach & Wawrzynski, 2005).

These studies reinforce Astin’s (1993) suggestion that faculty play a key role in undergraduate student development. The active learning techniques faculty implement lead to educational outcomes where students rise to the academic challenge of the classroom environment to use higher order thinking skills (Astin, 1993; Juarez, 2001; Lamport, 1993).

**Approaches to Learning**

The second body of work on higher order thinking describes the relationship between higher order (critical) thinking and student approaches to learning, specifically quality of effort and motivation (Chow, 2007; Kaufman & Creamer, 1991). Students’ ability to perform academic tasks at deeper levels of thinking is impacted by motivation with respect to the learning (Marton & Säljö, 1976). For example, if undergraduate students take a course for purposes of checking it off a list of requirements, they are more likely to exhibit surface, or lower level thinking strategies, such as recall or fact listing. If, however, students enroll in a course to prepare for graduate study, they tend to utilize deeper, or higher, level thinking skills (Biggs, Kember, & Leung, 2001).

In terms of motivation, students tend to engage critical thinking skills more often when they are more motivated to learn (Rugutt & Chemosit, 2009). Those who devote higher levels of energy to accomplishing a goal are more likely to perform at a higher level (Rugutt & Chemosit, 2009). Those who are intrinsically motivated exhibit characteristics such as curiosity. They take on challenging topics and interact socially to a greater extent. Students who are extrinsically motivated exhibit characteristics such as compliance with others’ expectations, a need for recognition, and a sense of competition (Lei, 2010). Externally motivated students are at greater
risk of poor academic performance than intrinsically motivated students (Williams & Williams, 2011).

**Faculty-student Interaction**

The third body of research on strategies associated with higher order thinking skills addresses student-faculty interaction. Unlike the kind of student-faculty interaction associated with active learning strategies in the classroom, these works look at interactions that take place outside of the classroom. Such interactions are a significant predictor of student success (Graunke & Woosley, 2005; Tinto, 1993). Essentially, students’ intellectual and academic development is enhanced through positive, out of class interactions with faculty (Cotten & Wilson, 2006; Kuh, 1995; Pascarella & Terenzini, 2005).

Students’ intellectual curiosity declines when interactions with faculty outside the classroom are mundane. The most frequent out-of-class interaction with faculty takes place during office hours when students seek help, for example, with their homework. These are more task-oriented and grade-focused purposes rather than interactions that promote higher order thinking. (Cotten & Wilson, 2006).

Beyond the type of interaction, other characteristics seem to influence student-faculty relations. For example, upper division students have more informal, non-classroom interactions with faculty than their first or second year counterparts. Likewise, students who devote more time to their studies and are better prepared academically and have greater levels of out-of-class faculty interaction (Hu & Kuh, 2001). Finally, involvement in undergraduate research is a form of interaction that increases the likelihood of positive HOT outcomes (Hu, Scheuch, Schwartz, Gayles, & Li, 2008).

In general, then, a defining element of promoting higher order thinking is student interaction with faculty no matter whether the contact is formal or informal, inside or outside the classroom, or with faculty in the major field of study (Reason, Terenzini, & Domingo, 2007). Students who experience positive interactions with faculty are more likely to report academic growth and satisfaction (Plecha, 2002, April; Reason, Terenzini, & Domingo, 2007; Volkwein, 1991).

**Outcomes Resulting from Students’ Non-academic Involvement on College Campuses**

I was interested in two elements related to NAIs. First, I wanted to know if NAIs could be grouped into factors. If so, I was secondarily interested in whether those factors were
associated with HOT. Consequently, it was important to examine the research on the outcomes associated with non-academic involvement and to see whether HOT was among those outcomes. So I examined the literature to see what types of NAIs lead to the same outcome and whether higher order thinking was among those outcomes. The review of literature revealed an array of NAIs that lead to five outcomes, none of which relates directly to HOT: (1) understanding of self, including self-confidence; (2) sense of competence and purpose; (3) character development; (4) examination of personal beliefs and perspectives; and (5) satisfaction.

**Understanding of Self**

Students report significantly higher levels of self-understanding than their peers if they engage in certain NAIs. For example, students who participate in leadership activities report statistically greater changes in the development of personal values, including self-understanding (Cress, Astin, Zimmerman-Oster, & Burkhardt, 2001). Leadership of group activities (like clubs and organizations) on campus strengthens students’ interpersonal relationships. In turn, stronger interpersonal relationships lead to growth in self-confidence and a more realistic self-concept. Students who have a strong sense of self demonstrate higher order leadership skills in their group activities such as integrating strategies that help people understand how to relate to others, coordinating groups’ social and organizational efforts, building commitments from members, and developing extended social networks (Day, 2001).

A number of other NAIs are also associated with increased self-understanding and/or self-confidence. For instance, students achieve outcomes related to self-understanding through involvement in religious and spiritually based programs and services (Astin & Antonio, 2004). Those who participate in student government exhibit increases in self-confidence through relationships they gain from active participation (Haber, Allen, Facca, & Shankman, 2012; Kuh & Lund, 1994). Furthermore, students involved in residence life leadership exhibit a greater sense of self-awareness and self-confidence (Renn & Lytle, 2010). The leadership experience in recreational sports builds students’ self-confidence (Hall, Forrester, & Borsz, 2008). Overall, self-confidence is an important outcome reported by students involved in a variety of student leadership experiences on campus (Komives, Longerbeam, Owen, Mainella, & Osteen, 2006; Komives, Owen, Longerbeam, Mainella, & Osteen, 2005).
**Sense of Competence and Purpose**

A second outcome associated with NAI is a well developed sense of competence and purpose. Students’ sense of competence and purpose are heavily influenced by community factors such as involvement in clubs and organizations, relationships with peers, topics of conversation, and a general sense that their environment is academically and culturally stimulating (Martin, 2000). Activities that lead to these outcomes include campus governance and student organizations, and recreational sports.

Students who are involved in campus governance report gains in their leadership competencies (Miles, 2011). They are allowed to try new ideas and make mistakes, thus they develop perseverance skills. These experiences help students clarify their purpose as leaders. In a study of 229 presidents of student organizations, establishing and clarifying purpose is most evident when they are involved consistently over time (Foubert & Grainger, 2006). Organizational leadership results in positive outcomes associated with competence such as developing enhanced interpersonal skills. Student leaders develop the ability to advocate on behalf of the organization and the causes for which organizational members take a stand. They are able to create an environment in which all members can contribute to the greater good (Logue, Hutchens, & Hector, 2005). These sorts of experiences lead to the development of sense of competence and purpose.

Sports are another mechanism that promotes increased sense of competence. Student leaders in recreational sports are able to identify their strengths and weaknesses. These play out in their organizational roles and are identified through reflection exercises. This also leads to a better understanding of purpose (Hall, Forrester, & Borsz, 2008).

**Character Development**

The literature revealed three primary activities that lead to character development: (1) religious and volunteer activities; (2) civic engagement; (3) and political activism. Character growth occurs as a result of engaging in religious activities. Students seek activities they can participate in during college that will strengthen their belief that they are living a meaningful life (Vogelgesang & Astin, 2005, April). The development of character is also evident through participation in volunteer efforts coordinated through religious student organizations. In a study of college alumni six years after graduation, those who had attended religious services in college exhibited higher levels of volunteer involvement than those who had not engaged in such
activities (Vogelgesang & Astin, 2005, April). This supports prior research on the relationship between participation in religious student organizations and volunteerism (Oesterle, Johnson, & Mortimer, 2004).

Students also develop character through civic engagement. Engaging in work that focuses on helping others in their communities is more meaningful than engagement in the social or political arena. Their motivation reflects a desire to “do/help” at a local level rather than to fundamentally change society or laws (Vogelgesang & Astin, 2005, April). Involvement in volunteer-focused student organizations increases the likelihood of meaningful civic engagement beyond college because it provides students with the tools to be active, engaged citizens after they graduate (Hurtado, Engberg, & Ponjuan, 2003). Conversely, adults who are engaged in their communities are more likely to have volunteered when they were in college (Misa, Anderson, & Yamamura, 2005).

Environment plays an important role in volunteerism. Students are more likely to be engaged in community service or volunteerism if they attend a college where their peers are equally committed to social and political activism. They maintain their commitment to civic engagement if they have a desire to influence the social values in their communities (Sax, Lindholm, Astin, Korn, Saenz, & Mahoney, 2004, December). A heightened sense of civic responsibility motivates students to volunteer on campus and in their community. Furthermore, students who perform acts of service have an increased sense of personal efficacy along with an increased awareness of the world, key qualities of character development (Astin, Vogelgesang, Ikeda, & Yee, 2000). In general, students who focus their energy on volunteering report they feel they can make more of a difference in their communities (Sax et al., 2004, December) an indicator of character development.

Finally, students’ involvement in political activism promotes the development of character. For example, attendance at racial/cultural awareness workshops, engagement in cross-racial interaction with peers, and participation in student government all serve as strong predictors of political activism in the post-college years (Misa, et al., 2005). Student engagement in political activism leads to moral awareness and interpersonal development, both markers of character development (Misa, et al., 2005). Students report outcomes of character development through leadership activities, civic engagement, and political activism through their involvement in non-academic activities (Astin, et al., 2000; Misa, et al., 2005; Sax et al., 2004, December).
Examination of Personal Beliefs and Perspectives

There are a number of NAIs associated with the development of personal beliefs and perspectives. Engaging with students from different backgrounds and a commitment to social agency activities are two NAIs in particular that result in students’ exploration of personal beliefs and perspectives.

Students examine their personal beliefs when they interact with others. They consider the strengths and weaknesses of their perspectives when engaging with peers from different racial backgrounds (Astin, & Antonio, 2004). Friendships across racial lines create opportunities to have conversations about alternative experiences and opinions that lead to more advanced levels of cultural awareness and racial understanding (Antonio, 2000; 2001). Specifically, students report their beliefs change in terms of cultural awareness and acceptance of persons from different races/cultures when they interact with others who are different from themselves (Gurin, et al., 2002). Multicultural student activities and intergroup discussions/programs hosted on campus increase opportunities for these types of interactions (Gurin, et al., 2002). In general, mingling with peers, faculty, staff, and members of their community who are different from themselves during their undergraduate years leads students to a broader worldview and desire to become a global citizen. Those who participate in diverse experiences develop more inclusive sociopolitical, gender, and racial/ethnic attitudes (Reason, Terenzini, & Domingo, 2006).

A second form of NAI that contributes to examination of perspectives is associated with social agency. Social agency is defined as the belief in taking action to improve society and work for social justice (Nelson Laird, 2005). By engaging in informal interactions with peers from diverse backgrounds, volunteering for political and social justice campaigns, helping others who are experiencing difficult life circumstances, adopting environmental causes, and participating in community action programs, students are more likely to learn lessons that prepare them to be engaged citizens committed to building a greater democracy (Gurin, et al., 2002). Furthermore cross-group interaction has the greatest impact on students who are motivated to reduce their own prejudice and are willing to employ social agency to promote inclusion and social justice (Zuniga, Williams, & Berger, 2005). Those who interact with diverse peers through ethnic/cultural activities (e.g., art exhibits, theater/dance performances) and social awareness programs achieve educational outcomes such as reducing their own prejudices and promoting
inclusion and social justice (Zuniga, Williams, & Berger, 2005). These outcomes are indicators of the development of personal beliefs and perspectives.

**Sense of Satisfaction**

The final key outcome of NAIs is students’ satisfaction with their college experience. The three key collegiate experiences that elicit satisfaction are: relationships with peers, faculty, and administrators; a perception of a supportive environment, including the opportunity to choose their institution if starting over; and mattering.

In the first few months at college, students lose contact with over half of their high school colleagues so they rely heavily on the new friendships they form on campus (Oswald & Clark, 2003). Students who adjust to college by making new friends and integrating into the social environment of their institution are more likely to be satisfied with their experience (Friedlander, Reid, Shupak, & Cribbie 2007). Part of social adjustment is to create a new social system, navigate new social responsibilities, and develop a sense of belonging at the institution (Friedlander, et al., 2007).

Students exhibit social competence and therefore greater satisfaction when they perceive their institution’s faculty and staff support their academic, personal, and social needs (Belcheir, 2001; Filikins & Doyle, 2002; Reason, et al., 2007; Zhao & Kuh, 2004). For example, a major predictor of students’ satisfaction in their college experience is whether they would choose the same college to attend if starting all over (Belcheir, 2001).

Finally, students’ are more likely to stay at the institution if they feel as if they matter, or in other words, describe a sense of belonging. Student involvement in co-curricular activities through residence life programming and organized social activities, including rituals and traditions, such as homecoming celebrations, sporting events, and social dances, are ways in which they can gain that sense of belonging (Cheng, 2004). There are countless studies noting the impact of student involvement on campus on satisfaction (Astin & Antonio, 2004; Cress, Astin, Zimmerman-Oster, & Burkhardt, 2001).

In summary, there is a wealth of literature on the activities that promote the development of higher order thinking skills among college students. In general, active learning strategies (Murray & Lang, 1997; Seifert, Pascarella, Wolniak, & Cruce, 2006; Stage, Muller, & Kinzie, 1998; Umbach & Wawrzynski, 2005; Whitmire, 1998), approaches to learning (Biggs, Kember, & Leung, 2001; Kaufman & Creamer, 1991; Lei, 2010; Marton and Säljö, 1976; Rugutt &
Chemosit, 2009; Williams & Williams, 2011), and faculty-student interactions (Cotten & Wilson, 2006; Graunke & Woosley, 2005; Hu, Scheuch, Schwartz, Gayles, & Li, 2008; Kuh, 1995; Pascarella & Terenzini, 1991; 2005; Tinto, 1993) are academic activities that lead to critical thinking and other forms of higher order thinking.

College students engage in non-academic activities as well, however, and those NAIs are associated with five outcomes, one of which is understanding of self, including self-confidence (Astin & Antonio, 2004; Cress, Astin, Zimmerman-Oster, & Burkhardt, 2001; Day, 2001; Kuh & Lund, 1994; Renn & Lytle, 2010). In addition, students’ sense of competence and purpose is a consequence of their involvement in NAIs (Hall, Forrester, & Borsz, 2008; Logue, et al., 2005; Martin, 2000; Miles, 2011). A third outcome of student involvement in NAIs is character development (Hurtado, Engberg, & Ponjuan, 2003; Misa, et al., 2005; Verba, Schlozman, & Brady, 1995; Vogelgesang & Astin, 2005). Furthermore, development of personal beliefs and perspectives is an outcome of student involvement in NAIs (Antonio, 2000, 2001; Astin, & Antonio, 2004; Guarasci & Cornwell, 1997; Gurin, et al., 2002; Reason, Terenzini, & Domingo, 2006). Finally, students’ sense of satisfaction and mattering is the fifth outcome of their involvement in NAIs (Astin, 1993; Belcheir, 2001; Filikins & Doyle, 2002; Friedlander, et al., 2007; Oswald & Clark, 2003).

Overall, research has identified academic activities that lead to HOT outcomes. Additionally, the literature confirms that NAIs lead to other outcomes for college students. These NAIs include: membership and leadership in student clubs and organizations, involvement in religious and spiritual based programs and services, student government work, participation in residence life activities, recreational sports, volunteer or community service activities, political activism, social justice work, multicultural activities (including art exhibits and theater/dance performances), programs and activities that encourage intergroup dialogue, community action programs, relationships with peers, faculty, and staff, established social support systems, and attendance at institutional rituals and traditions, such as homecoming, sporting, and social events.

What has yet to be explored is whether these same NAIs a) can be grouped into factors and b) whether those factors are associated with the outcome of higher order thinking. These are the gaps in the literature that I explored in my study. I grouped the activities that emerged from the literature into eight types of NAIs: leadership in clubs and organizations: engagement in religious activities: intergroup dialogue through involvement in cross-cultural friendships,
discussions, and events including attendance at art exhibits, theatre and dance performances; participation in activities related to social agency such as community service, student governance, and political activism; physical fitness through activities such as recreational sports; residence life; socializing with peers and membership in social organizations; and relationships with peers, faculty, and staff through non-academic activities. I assumed this exercise would enable me to more readily identify proxies on the NSSE that could be used to measure NAIs. Table 1 lists these literature groups and the associated types of NAIs.
<table>
<thead>
<tr>
<th>Literature Groupings</th>
<th>Types of NAIs</th>
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<tbody>
<tr>
<td>Clubs and organizations</td>
<td>Membership and leadership in student clubs and organizations</td>
</tr>
<tr>
<td>Religious activities</td>
<td>Involvement in religious and spiritual based programs and services</td>
</tr>
<tr>
<td>Intergroup dialogue, art, theatre, and dance</td>
<td>Multicultural activities (including art exhibits and theater/dance performances); Programs and activities that encourage intergroup dialogue</td>
</tr>
<tr>
<td>Social agency, community service, student governance, and political activism</td>
<td>Participation in student government work; Volunteer or community service activities; Political activism; Social justice work; Community action programs</td>
</tr>
<tr>
<td>Physical fitness</td>
<td>Recreational sports involvement</td>
</tr>
<tr>
<td>Residence life</td>
<td>Participation in residence life activities</td>
</tr>
<tr>
<td>Socializing and social organizations</td>
<td>Participation in established social support systems; Attendance at institutional rituals and traditions (homecoming, sporting and social events)</td>
</tr>
<tr>
<td>Relationships with peers, faculty, and staff</td>
<td>Relationships with peers, faculty, and staff</td>
</tr>
</tbody>
</table>
Chapter Three

Method

The purpose of this study was two-fold. The first was to test whether non-academic involvement factors emerged from NSSE data. I used the literature to identify NAIs that lead to positive outcomes among college students. I then identified items on the NSSE that reflected those NAIs and conducted exploratory factor analysis to see if items could be clustered into factors. The second purpose was to explore whether these factors explained variance in HOT skills. The conceptual framework for understanding HOT skills was a modified version of Bloom’s Taxonomy (Bloom, Krathwohl, & Masia, 1956) that described thinking as a progression of six skills building in complexity from acquiring knowledge through comprehension, application, analysis, and synthesis, to evaluation. For purposes of this study, I used participants’ responses on the NSSE that measured the frequency with which they used applying, analyzing, synthesizing, and making judgments skills in the past year to create a composite score for HOT.

The NSSE is administered to first year and senior students at institutions of higher education across the U.S. to capture participants’ self-reported college experiences both in and out of the classroom. The data for my study came from a sample comprised of 2,000 full-time degree-seeking seniors who were native to their institution and who had completed the NSSE in spring 2010.

This study was designed to address the following research questions:

1. What independent factors are measured by items on the NSSE related to NAIs?
2. How much of the variance in HOT is accounted for by the extracted NAI factors?

Chapter Three describes the method employed in the study. This includes a description of the National Survey for Student Engagement as well as the procedures I used in sampling, data collection, and data analysis.

The National Survey for Student Engagement

An overview of the survey instrument used for this study is helpful in understanding the procedures I employed in the study. The National Survey for Student Engagement (NSSE) is an ongoing research project conducted by the Indiana University Center for Postsecondary Research. The main purpose of the NSSE study is to “collect information at hundreds of four-year colleges and universities about student participation in programs and activities that
institutions provide for their learning and personal development. The results provide an estimate of how undergraduates spend their time and what they gain from attending college” (NSSE, 2012, August 14, p.1).

According to NSSE, over 1,400 institutions have administered the NSSE on their campuses since the survey began distribution in 2000 though most institutions survey their participants on a three-year cycle. In 2011, 750 institutions distributed the survey (NSSE, n.d.). NSSE data are one resource available to higher education administrators to understand good practices implemented at four-year colleges and universities. The data can also be useful for prospective college participants, parents, college counselors, academic advisers, institutional research officers, and researchers (NSSE, 2012, August 14, p.1).

**Sampling Procedures**

The sample for the NSSE is initially generated by individual institutions. Each participating institution creates a population file that includes data on all first year and senior baccalaureate degree-seeking participants. The population file includes a unique student identifier, first and last name, e-mail and/or mailing addresses, class standing, enrollment status, and gender. The list can also include optional variables including race, ACT or SAT score, and up to five unique variables of the institution’s own choosing. The population file is uploaded to a secure NSSE institution interface. NSSE then sends the survey to all participants in the participating institution’s population file. The 2010 NSSE population included approximately 1.4 million eligible participants at participating institutions. There were 478,079 total respondents (NSSE, 2012, August 14).

I employed a subset of responses from the larger NSSE sample in my study. The target population for purposes of this study was senior degree seeking participants who completed the 2010 NSSE survey between January and April 2010 I established five criteria for respondents to be included in this study: (1) senior classification; (2) year of birth; (3) native student status (i.e., started at same institution as currently enrolled); (4) international student or foreign national classification; and (5) enrollment status.

The first selection criterion related to class standing. The NSSE is typically administered to first year and senior participants. Since my study explored HOT scores and NAIs, I was interested in including only those participants who self-identified as seniors on the NSSE. I
assumed that seniors (as opposed to first-year students) would have been at their institution long enough to have accumulated NAIs and to have used various types of thinking skills.

The second selection criterion related to year of birth. The NSSE is typically administered to participants in their first and senior years. I wanted to look at traditional aged college participants so I requested that all participants have a birth year between 1984 and 1988 so they were 20-24 years old at the time they completed the NSSE as seniors in 2010.

The third selection criterion addressed any issues that might have arisen if transfer students were included in the sample. If I included respondents who had transferred from another institution I would not have been able to decipher if the NAIs were reflective of their experiences at their current or previous institution. There is an item on the NSSE that asks participants if they started at their current institution or started elsewhere. I requested a sample that included only those participants who reported that they started at their current institution (native students).

The fourth selection criterion for purposes of this study was whether participants indicated they were an international student or foreign national. I believed that cultural differences among international students might have influenced the results of the study in some unforeseen manner. The NSSE asked participants a yes or no question about whether they were an international student or foreign national. In my request for a data slice, I asked that respondents be restricted to those who responded “no” to that item.

The fifth selection criterion for this study was the enrollment status of participants. I wanted to control enrollment status because I was interested in data from those who had a traditional college experience which I believed was more indicative of full-time enrolled students. Participants were asked on the NSSE if during their current academic term they would characterize their enrollment as full-time or less than full time. I asked that only those who reported that they were enrolled full time be included in the data slice.

In summary, I asked NSSE staff to pull a total sample of 2,000 respondents, who were seniors, born between 1984-1988, native to their institution, not an international or foreign student, and enrolled full-time. These respondents comprised the sample for my study.

Instrumentation and Data Collection

The 2010 NSSE was a self-report survey conducted either on-line or via pencil and paper. The instrument included five sections consisting of 70 items. The first section was made up of questions pertaining to respondents’ involvement in educationally purposeful activities (Kuh,
2002). There were five introductory clauses in this section, each followed by a series of items. For example, one introductory clause asked, “In your experience at your institution during the current school year, about how often have you done each of the following…? The items included activities like “Asked questions in class or contributed to class discussions.” The response options were “Very Often, Often, Sometimes, Never.”

The second section of the NSSE instrument consisted of items pertaining to participants’ experiences with programs and services provided by their institution (Kuh, 2009). There were four introductory clauses with corresponding items. For example, respondents were asked “Overall, how would you evaluate the quality of academic advising you have received at your institution?” The response options were “Excellent, Good, Fair, and Poor.”

The third section addressed participants’ perceptions of their environment (Kuh, 2002). Each of the three items consisted of an introductory clause followed by a series of items. Each item had a unique set of response options. The first introductory clause read “Mark the box that best represents the quality of your relationships with people at your institution.” There were seven items under this introductory clause. One item asked about “Relationships with other students” and response options ranged from “Unfriendly, unsupportive, sense of alienation” to “Friendly, supportive, sense of belonging.” The second introductory clause asked about “Relationships with faculty members” and response options ranged from “Unavailable, unhelpful, unsympathetic” to “Available, helpful, sympathetic.” Finally, the third introductory clause asked about “Relationships with administrative personnel and offices” and response options ranged from “Unhelpful, inconsiderate, rigid” to “Helpful, considerate, flexible.”

The fourth section asked participants to estimate their educational and personal growth since starting college (Kuh, 2009). There were two introductory clauses in this section with multiple items. Participants were asked about their participation in a variety of activities on campus such as attending an art exhibit or learning something that changed the way they understood an issue or concept. Response options ranged from “Very often” to “Never.” This section also asked participants about their participation in or plans to participate in a variety of experiences ranging from studying abroad to practicums, field experiences, or clinical assignments. Participants chose from four response options that ranged from “Done” to “Have Not Decided.”
The fifth section sought information about demographic characteristics (Kuh, 2002). The 14 items in this section elicited information about participants’ personal and family educational backgrounds. There were questions pertaining to participants’ year of birth, sex, whether they were an international student or foreign national, and their racial or ethnic identification. In addition, participants were asked about their college academic history. They were also asked about their parents’ educational experience. Finally, participants were asked about their current living arrangements and involvement in varsity athletics and social fraternities or sororities during their college experience.

The five sections of the NSSE served as a starting point to select variables for purposes of my study. After reviewing all the NSSE items I was able to select those that were related to NAIs and HOT.

**Variable Selection**

Variable selection was driven by the literature review. That review revealed an array of NAIs that lead to positive outcomes and I grouped that array into 8 types (see Table 1). I reviewed every item on the NSSE to see which items could be considered proxies for these eight types of NAIs. Table 2 summarizes the items from the NSSE that were used in this study, including the introductory clause followed by the selected items associated with that clause. The table also offers the response options for each item, and an explanation of how responses were re-coded, if re-coding was necessary.

The dependent variable, Higher Order Thinking (HOT), was calculated from one NSSE item. That item asked the participants how much their coursework emphasized the following mental activities: (1) Memorizing; (2) Analyzing; (3) Synthesizing; (4) Making judgments; and (5) Applying. The response options ran along a 4-point Likert scale ranging from Very Little (1) to Very Much (4). For purposes of this study, I was interested only in participants’ responses to the analyzing, synthesizing, making judgments, and applying response options. This study looked at higher order thinking skills and according to Bloom’s taxonomy (1956) applying, analyzing, synthesizing, and making judgments are higher order thinking skills so I excluded memorizing from the analysis. Essentially, then, I created a composite score by adding participants’ responses about the frequency with which they reported their coursework in the past year emphasized applying, analyzing, synthesizing, and making judgments skills. Scores could range from 4 to 16.
<table>
<thead>
<tr>
<th>Dependent (DV) or Independent Variable (IV) Type</th>
<th>Introductory Clause</th>
<th>Item</th>
<th>Response Options</th>
<th>Recoded As</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV</td>
<td>During the current school year how much has your coursework emphasized the following mental activities?</td>
<td>Analyzing</td>
<td>1=Very Much</td>
<td>1=Very Little</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Synthesizing</td>
<td>2=Quite a Big</td>
<td>2=Some</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Making judgments</td>
<td>3=Some</td>
<td>3=Quite a Bit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Applying</td>
<td>4=Very Little</td>
<td>4=Very Much</td>
</tr>
<tr>
<td>IV</td>
<td>How often have you done each of the following?</td>
<td>Exercise/physical activity</td>
<td>1=Never</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spiritual activity</td>
<td>2=Sometimes</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Attended art/ play/dance</td>
<td>3=Often</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Work effectively with others</td>
<td>4=Very Often</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voting in elections</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conversations w/ participants of different race/ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conversations w/ participants of different relig./political opinion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Understand others perspectives</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learned another perspective to change understanding of issue/concept</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2 (continued)

*Non-academic Student Involvement Items from 2010 NSSE*

<table>
<thead>
<tr>
<th>Variable Type</th>
<th>Introductory Clause</th>
<th>Item</th>
<th>Response Options</th>
<th>Recoded As</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>Which of the following have you done or do you plan to do before you graduate from your institution?</td>
<td>Community service/volunteer</td>
<td>1=Have Not Decided  2=Do Not Plan To Do  3=Plan To Do  4=Done</td>
<td>0=Have Not Decided, Do Not Plan To Do, Plan To Do, Done 1=Done</td>
</tr>
<tr>
<td>IV</td>
<td>About how many hours do you spend in a typical 7-day week doing each of the following?</td>
<td>Relaxing/ socializing</td>
<td>1=0; 2=1-5; 3=6-10; 4=11-15; 5=16-20; 6=21-25; 7=26-30; 8=&gt;30</td>
<td>1=&gt;30; 26-30 2=21-25; 16-20 3=11-15; 6-10 4=1-5; 0</td>
</tr>
<tr>
<td>IV</td>
<td>Mark the box that best represents the quality of your relationships with people at your institution:</td>
<td>Relationships with students</td>
<td>Box 1= “Unfriendly, unsupportive, sense of alienation”  Box 7 = “Friendly, supportive, sense of belonging”</td>
<td>TBD</td>
</tr>
<tr>
<td>Variable Type</td>
<td>Introductory Clause</td>
<td>Item</td>
<td>Response Options</td>
<td>Recoded As</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------</td>
<td>------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>IV</td>
<td>Mark the box that best represents the quality of your relationships with people at your institution:</td>
<td>Relationships with faculty</td>
<td>Box 1 = “Unavailable, unhelpful, unsympathetic” Box 7 = “Available, helpful, sympathetic”</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>Relationships with administrative personnel/offices</td>
<td></td>
<td>Box 1 = “Unhelpful, inconsiderate, rigid” Box 7 = “Helpful, considerate, flexible.”</td>
<td>TBD</td>
</tr>
</tbody>
</table>
In terms of independent variables, the first step of the data analysis was to conduct exploratory factor analysis to see if NAI factors emerged from the NSSE items. If so, I would then identify how to calculate a composite score and range of scores for each factor. That process, if factors do indeed emerge, will be described in Chapter Four.

Finally, one potential limitation to the study is important to note at this point. The NSSE items asked about participants’ experiences at the individual and institutional level. There has been some debate about the legitimacy of the scales given these two foci. The concern is that the participants’ experiences at their institution, as reflected in their responses to institutional level items, may or may not impact the student engagement outcomes, when combined with the individual level item responses. Previous research by Pike (2006) and Kuh (2001) has validated the use of scales, or in the case of Pike, scalelets, with mixed type items, however. I assumed that combining individual and institutional items yielded valid measures of NAIs.

**Reliability and Validity**

A reliable survey yields consistent responses over multiple distributions of the instrument (McMillan, 2000). The NSSE researchers measured three types of reliability: (a) internal consistency, (b) temporal stability, and (c) equivalence. Internal consistency reliability takes into consideration the interplay or correlation of the survey items (Pedhazur & Schmelkin, 1991). The Cronbach alpha score measures internal consistency. A Cronbach alpha score closer to 1.0 has a higher reliability. In other words, the survey items complement each other in their measurement of different aspects of the same variable (Litwin, 2003). The NSSE researchers categorized all NSSE items into five benchmark scales. They ran Cronbach Alpha tests for each benchmark based on year in college. Three of the five NSSE benchmarks had alpha scores that ranged from .724 to .796 and were considered strongly correlated. The reliabilities for the other two benchmarks were .618 and .681 (NSSE, 2010, October 13a), somewhat weaker correlations.

A second measure of reliability used by NSSE was temporal stability, or test-retest. This method of reliability measures the consistency of scores over multiple administrations of the survey. The correlation coefficient is the estimate of reliability for the measure (Pedhazur & Schmelkin, 1991). A Pearson’s $r$ score that is closer to 1.0 has a higher reliability. The NSSE researchers conducted Pearson correlations for a random sample of institutions from the 2007 and 2008 administrations of the NSSE. They were interested in whether there was a relationship between the NSSE benchmark scores for the two years. Correlation results ranged in $r$ scores
from .720 to .938 (NSSE, 2010, October 13b). Litwin (2003) suggests that correlations over .70 have strong enough correlation to consider scores related.

The third reliability measure for the 2010 NSSE was coefficients of equivalence. This type of reliability looks at whether two different forms of a measure have correlating scores that measure the same phenomenon (Pedhazur & Schmelkin, 1991). In 2006, NSSE researchers measured three areas of the survey to understand consistency of student responses. The researchers asked the same questions at two different points in the survey, the first with a quantifier response, and the second with a quantifiable response. The results indicated that there was a linear relationship with very little difference between the subgroups (NSSE, 2010, October 13c). NSSE researchers did not report actual statistics; therefore, this measure of reliability may need to be explored further to verify the coefficients of equivalence.

Validity determines whether a survey instrument measures what it was meant to measure (Creswell, 2003). The NSSE researchers tested seven types of validity: (a) response process validity, (b) content validity, (c) construct validity, (d) concurrent validity, (e) predictive validity, (f) known groups validity, and (g) consequential validity. The first measure of validity was response process validity. It is meant to measure whether the study participants interpreted the items as intended. This type of measure is not quantifiable, but rather observable through focus groups and interviews of study participants. NSSE researchers conducted focus groups in 2000 at eight colleges and universities to measure response process validity of the survey instrument. They learned there were several survey items that needed revision. The changes were reflected in 2001 and retained in later survey editions (NSSE, 2010, February 19a). In addition, NSSE researchers conducted interviews with participants of different races to understand response process validity of the survey instrument. In 2005 they interviewed participants at four minority-serving institutions and with minority and underrepresented groups at four predominately white institutions. Results from the interviews resulted in revisions to the 2006 and subsequent surveys (NSSE, 2010, February 19b).

The second measure of validity for the NSSE was content validity. This measure determines whether a survey instrument is gathering the information it was intended to measure when it was constructed (Creswell, 2003). There is no statistical measure to analyze this validity standard. Rather, experts in the field determined this measure through their renowned knowledge of the subject matter (McMillan, 2000). Experts reviewed the NSSE survey to determine if what
the NSSE researchers hoped to understand from the survey results, student engagement, was actually being captured by the items on the survey. In addition, experts in the field determined if the survey included items that captured most aspects of student engagement (Kuh, 2009).

The third measure of validity of the NSSE survey was construct validity. Creswell (2003) describes construct validity as the degree to which the instrument measures the theoretical concept. NSSE researchers analyzed a concept introduced in a study by Laird, Schoup, and Kuh (2005, May) that used 2006 data. They wanted to determine if the construct researchers developed to understand higher order thinking, reflective thinking, and integrative learning would be evident using more recent NSSE data. The NSSE researchers ran an exploratory factor analysis to determine if 2009 NSSE items factored together as in the previous study. In fact, the results supported the 2008 study with eigenvalues in the three factor solution measuring .82 for the higher order learning scale, .70 for the integrative learning scale, and .80 for the reflective learning scale (NSSE, 2010, October 13d).

The fourth measure of validity of the NSSE instrument was concurrent validity. This measure was meant to determine if the instrument measured the concept in the same way that other instruments measure the concept. The NSSE utilized a similar survey instrument, the BCSSE, which measures pre-college characteristics of student engagement to assess whether the NSSE yields similar results but for first-year college-age student engagement. If BCSSE scales were highly related to NSSE benchmarks, then this would serve as evidence of concurrent validity. The sample consisted of 13,000 participants from 91 institutions who took the 2008 BCSSE and then the 2009 NSSE. The results showed that student characteristics, along with their expectations and attitudes are predictors for first-year student engagement. On the other hand, there was enough variance between the survey instruments to indicate that the largest predictor for first-year student engagement could be from the immediate campus environment. In addition, the NSSE researchers hypothesized that the BCSSE high school academic engagement scale would predict the NSSE items in the academic challenge benchmark. There was an effect size of .31. This was a significant score confirming the hypothesis of NSSE researchers. Academic perseverance and expected academic engagement were significantly related to level of academic challenge even after controlling for various student and institutional characteristics (NSSE, 2012, May 7).
The fifth measure of validity of the NSSE instrument was predictive validity. This type of instrument validation refers to a measure that yields expected results based on known student engagement mannerisms. The NSSE researchers tested this type of validity by analyzing the survey results in conjunction with predicted college success measures of student engagement. The results showed that the majority of NSSE items do relate to undergraduate outcomes, such as persistence and number of credit hours earned. Survey administrators also found that many of these predictive measures were influenced by pre-college academic abilities of study participants (NSSE, 2010, October 13f).

The sixth measure of validity of the NSSE was known groups validity. NSSE researchers wanted to determine if the survey instrument elicited results of understood differences among various groups of participants. In 2009, the NSSE researchers analyzed data from a randomly selected sample of all participants to measure this form of validity. There is student engagement research that predicts that undergraduate experiences may differ based on different classifications such as gender, or membership in fraternities or sororities, among others (Pascarella & Terenzini, 2005). The NSSE researchers wanted to determine if the NSSE survey results would also yield these known group differences. By running t-tests and ANOVAs, they found there were mean score differences between participants by enrollment status, gender, institution type (public or private), Carnegie classification, and various areas of student involvement thus confirming known groups validity (NSSE, 2010, October 13e).

The seventh, and final, measure of validity of the NSSE was consequential validity. This type of validity looks at how the results are used. Consequential validity is supported when the results are used for the purposes for which the measure was designed. In the case of NSSE, the survey instrument was designed to measure undergraduate experiences in the college setting. The researchers compiled a list of how the NSSE instrument had been used to support this form of validity (NSSE, 2010, October 13g).

The psychometric properties of the NSSE instrument reinforced the intention of the instrument to determine the extent to which students expend time and energy in educationally purposeful activities. Studies by Kuh (2001, 2003) note that the intention of this instrument has been confirmed with empirical studies with similar outcomes (Kuh, Hayek, Carini, Ouimet, Gonyea, & Kennedy, 2001, September). In all, the NSSE is considered a valid and reliable instrument.
Data Collection

The first step in the data collection process was to obtain permission to conduct this study from the Institutional Review Board (IRB) at my institution (see Appendix A). Once the IRB approved, the data were collected and analyzed.

The 2010 NSSE survey was administered at participating institutions between January and April. Participants were invited to complete the NSSE via e-mail or a mailing, depending on the agreement between their institution and NSSE. A series of reminders was sent from NSSE to participants to encourage them to complete the survey.

To obtain my data, I completed the NSSE Data Sharing Form. This form asked for principal investigator contact information, the purpose statement and research questions for the study, a description of the data file I was interested in borrowing, the approximate start and end date of data analysis, other data I proposed to merge or match with the NSSE data, and the contact information for all researchers who would have access to the data for purposes of the study. The form was submitted to a research analyst at NSSE for consideration. Upon approval, the dataset of responses from a sample that met all selection criteria was provided to me in SPSS format. All individual identifiers were deleted from the dataset before it was sent to me.

Data Analysis

The data analysis procedure was completed in several steps. Before any analyses were run, there were two steps of data preparation – addressing missing data and recoding. The first step was to clean the data to account for missing demographic variables in the cases eligible for inclusion in the study. In order to be eligible to be used in the analysis, the case had to have data in items pertaining to year in school (senior), birth year (1984-1988), native student status (started at same institution as currently enrolled), international student or foreign national (marked “no”), and enrollment status (full-time). If they were missing any of these variables, cases were removed from the study. If cases were missing other demographic items, I ignored the missing data recognizing that I would have uneven sample sizes.

In regard to addressing missing variables for items included in the HOT composite score, I used the listwise deletion method. The HOT composite score was calculated from participants’ responses to four items on the NSSE. If there were missing cases in the four items included in the HOT composite score, the record was removed from pool. I accounted for missing variables for each NAI item in the same way I did for the HOT items.
The second step in the data preparation procedures was recoding (see Table 2). There were several items with the same introductory clause that needed recoding. One introductory clause asked participants how many hours per 7-day week they spent on select activities. The response options were divided into 8 categories based on the amount of time they spent on the activities. For purposes of this study, I recoded the hours from eight to four categories so that 1 equaled to 26 to 30+ hours; 2 equaled to 16-25 hours; 3 equaled to 6-15 hours; and 4 equaled to 0-5 hours. I narrowed the number of categories was because I was interested in the bigger picture of how spending a limited number of hours versus an extensive number of hours at a particular activity impacted the results. For purposes of this study, spending more hours on the activity was considered less desirable.

Another introductory clause asked participants if they had completed or planned to complete certain experiences before they graduated from their institution. Response options ranged from 1 equaled Have Not Decided; 2 equaled Do Not Plan To Do; 3 equaled Plan To Do; and 4 equaled Done. For purposes of this study, I recoded the intentions of participants’ involvement so that 1 equaled to Done and 0 equaled Have Not Decided, Do Not Plan To Do, and Plan To Do. In order to more fully understand the relationship between the selected non-academic activities and higher order thinking skills, I was interested in whether or not the participant had participated, not whether they planned to do so.

The remaining introductory clauses that needed to be recoded asked participants to rate the quality of their relationships with people at their institution, including other students, members of the faculty, and administrative support personnel. There were 7 response options to each introductory clause. For purposes of recoding, the responses were collapsed to four categories. I determined how to delineate the four categories after the data were received from NSSE so there would be equal distribution of responses in each category. Since the original response options were an odd number, there was less chance for equal distribution across categories. By waiting to divide the data from seven response options to four categories, the data would have less variation between categories and therefore improve robustness of the item.

Once the data preparation procedures were completed, exploratory factor analyses were run to determine if NAI factors emerged (the subject of the first research question posed in the study). A Cronbach alpha reliability of .70 or better among a set of items was considered sufficiently reliable to conclude that those items could be considered a factor. If a factor emerged
that consisted of several items but had a reliability less than .70 I removed low scoring items to see if that would strengthen the reliability of the factor. I sought to ensure that there were three or more items with an alpha reliability of .70 or better in order for a group of items to be considered a factor.

Finally, assuming that NAI factors did emerge, to determine the extent to which those factors explained the variance in HOTs I ran a multiple regression analysis. I created a HOT score by adding the scores. The total scores could range from 4 to 16. The independent variables were the NAI factors. I generated a multiple linear regression model based on the assumption that one or more independent variable (NAI factor) had a significant effect on HOT score. The analysis described the importance of various combinations of NAIs, including all main effects and all interactions among the factors. This analysis addressed the second research question posed in the study.

In conclusion, the purpose of this study was to determine if NAI factors emerged from NSSE data. Furthermore, I wanted to understand the degree to which non-academic forms of student involvement (NAIs) explained the variance in higher order thinking (HOT) scores among respondents to the 2010 NSSE. The methodology described in this chapter was considered sufficient to address the research questions posed in this study.
Chapter Four
Results of Study

The purpose of this chapter is to report the findings of the study. I start by describing the sample for the study, including changes I made in how I addressed missing data and recoding data for certain items. Then I explain the data analysis process. The first step in that process was to determine if there were commonalities among the 14 non-academic items identified in the NSSE to form factors. These findings related to the first research question.

Once the factors were identified, the second step was to understand if the identified NAI factors explained the variance in students’ HOTs. This process sought to answer research question two.

Description of the Sample

The data for this study came from a pre-existing 2010 NSSE data set. The demographic information relevant to this study is described in Table 3. Three cases were missing data related to either sex or race. Among the remaining 1,997 participants, there was nearly a 40/60 ratio of males $n=761$ to females $n=1,236$. The racial composition of the sample was predominately white $n=1,559$ at 78% of participants. The other 21.9% of respondents were members of nine self-reported racial categories, including an option not to respond to the question.

Missing Data

Once I received the dataset from NSSE, I reviewed it and found relatively few instances of missing data. Therefore, I decided not to replace missing data with the mean score of the total population. Instead, I used the listwise deletion method. Listwise deletion eliminates the record from the analysis if there are missing items relevant to that particular analysis. With a sample size of 2,000, missing three cases did not impact the results of the analysis.

Recoding Data

In Chapter 3 I described the recoding plan for most items. There were three items, however, that I could not determine how I was going to recode until I received the dataset. I knew that I wanted to divide the 7-response options for these items into four categories of approximately the same number of responses. For example, one item asked “Mark the box that best represents the quality of your relationships with people at your institution: Relationships with students” box 1 is equal to “Unfriendly, unsupportive, sense of alienation” to box 7 is equal to “Friendly,
Table 3

Demographic Information for 2010 NSSE Survey Sample (N = 1997)

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>761</td>
<td>38.1</td>
</tr>
<tr>
<td>Female</td>
<td>1236</td>
<td>61.8</td>
</tr>
<tr>
<td>Total</td>
<td>1997</td>
<td>99.9</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or other Native American</td>
<td>7</td>
<td>0.4</td>
</tr>
<tr>
<td>Asian, Asian American or Pacific Islander</td>
<td>76</td>
<td>3.8</td>
</tr>
<tr>
<td>Black or African American</td>
<td>97</td>
<td>4.9</td>
</tr>
<tr>
<td>White (non-Hispanic)</td>
<td>1559</td>
<td>78.0</td>
</tr>
<tr>
<td>Mexican or Mexican American</td>
<td>39</td>
<td>2.0</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>22</td>
<td>1.1</td>
</tr>
<tr>
<td>Other Hispanic or Latino</td>
<td>32</td>
<td>1.8</td>
</tr>
<tr>
<td>Multiracial</td>
<td>41</td>
<td>2.1</td>
</tr>
<tr>
<td>Other</td>
<td>21</td>
<td>1.1</td>
</tr>
<tr>
<td>Prefer not to respond</td>
<td>103</td>
<td>5.2</td>
</tr>
<tr>
<td>Total</td>
<td>1997</td>
<td>99.9</td>
</tr>
</tbody>
</table>
supportive, sense of belonging.” The boxes in between these two endpoints did not have assigned verbiage. I recoded boxes 1-4 to equal 1; box 5 to equal 2; box 6 to equal 3; and box 7 to equal 4. The recoding was based on the frequency of data divided into four equal parts by running a frequency analysis divided into quartiles. This recoding meant that there was equal distribution of responses across 4 categories. The higher number is the desirable response because that means the students’ relationships with other students was friendlier, supportive, with a sense of belonging. Table 4 describes the recoding for the three items.

**Independent Factors being Measured by Multiple Items on the NSSE related to NAIs**

In order to answer the first research question, I needed to perform an exploratory factor analysis. If factors were revealed during the analysis, then I needed to follow the exploratory factor analysis with Cronbach alpha reliability tests. The results from the reliability test would determine what factors, if any, would be included in the analysis of the second research question.

**Exploratory Factor Analysis**

I took several steps to identify three independent factors with multiple NAI items from the NSSE. First, I analyzed the relationships among the 14 NAI NSSE items identified for this study (see Table 5). There was correlation between 12 of the 14 items (> .3). In addition to looking at the correlation of the items, I also analyzed the Kaiser-Meyer-Olkin measure of sampling adequacy. This analysis determines the appropriateness of the factor analysis. A measure between 0.5-1.0 is adequate for the items to proceed through the factor analysis. The result from my study (.74) was in the recommended range to move forward. Finally, analysis of the Bartlett’s test of sphericity was significant ($\chi^2 (91) = 4572.406, p < .01$). The Bartlett’s test of sphericity measures the hypothesis that the variables are uncorrelated. In other words, the variables are independent enough that they can stand alone in the factor analysis. Given these overall indicators, factor analysis was conducted for all 14 items.

The next step was to enter the 14 NAI items identified for this study into the factor analysis equation. Using principal component analysis, I extracted based on an eigenvalue greater than 1. There was no initial rotation. I ran a scree plot to further understand the data (see Figure 1). From the initial analysis and the scree plot, there seemed to be four possible components to be extracted from the data.
<table>
<thead>
<tr>
<th>Variable Type</th>
<th>Introductory Clause</th>
<th>Item</th>
<th>Response Options</th>
<th>Recoded As</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>Mark the box that best represents the quality of your relationships with people at your institution:</td>
<td>Relationships with students</td>
<td>Box 1 = “Unfriendly, unsupportive, sense of alienation” Box 7 = “Friendly, supportive, sense of belonging”</td>
<td>Box 1=1 Box 2=1 Box 3=1 Box 4=1 Box 5=2 Box 6=3 Box 7=4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relationships with faculty</td>
<td>Box 1 = “Unavailable, unhelpful, unsympathetic” Box 7 = “Available, helpful, sympathetic”</td>
<td>Box 1=1 Box 2=1 Box 3=1 Box 4=1 Box 5=2 Box 6=3 Box 7=4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relationships with administrative personnel/offices</td>
<td>Box 1 = “Unhelpful, inconsiderate, rigid” Box 7 = “Helpful, considerate, flexible.”</td>
<td>Box 1=1 Box 2=1 Box 3=1 Box 4=2 Box 5=3 Box 6=4 Box 7=4</td>
</tr>
</tbody>
</table>
Table 5

*Factor Communalities Based on a Principal Components Analysis for 14 items from the National Survey for Student Engagement (NSSE) (N = 1997)*

<table>
<thead>
<tr>
<th>NSSE Item</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values</td>
<td>.787</td>
</tr>
<tr>
<td>Had serious conversations with students of a different race or ethnicity than your own</td>
<td>.768</td>
</tr>
<tr>
<td>Relationships with faculty members</td>
<td>.580</td>
</tr>
<tr>
<td>Relationships with other students</td>
<td>.577</td>
</tr>
<tr>
<td>Learned something that changed the way you understand an issue or concept</td>
<td>.575</td>
</tr>
<tr>
<td>Tried to better understand someone else’s views by imagining how an issue looks from his or her perspective</td>
<td>.575</td>
</tr>
<tr>
<td>Participated in activities to enhance your spirituality (worship, meditation, prayer, etc.)</td>
<td>.571</td>
</tr>
<tr>
<td>Relationships with administrative professionals and offices</td>
<td>.544</td>
</tr>
<tr>
<td>Institutional contribution: Working effectively with others</td>
<td>.465</td>
</tr>
<tr>
<td>Community service or volunteer work</td>
<td>.452</td>
</tr>
<tr>
<td>Institutional contribution: Voting in local, state (provincial), or national (federal) elections</td>
<td>.447</td>
</tr>
<tr>
<td>Attended an art exhibit, play, dance, music, theater, or other performance</td>
<td>.321</td>
</tr>
<tr>
<td>Exercised or participated in physical fitness activities</td>
<td>.269</td>
</tr>
<tr>
<td>Relaxing and socializing (watching TV, partying, etc.)</td>
<td>.204</td>
</tr>
</tbody>
</table>
The eigenvalues of four of the fourteen items were less than .5 and therefore needed to be removed from the analysis. I removed the items one at a time with a varimax rotation in the following order: (1) Attended an art exhibit, play, dance, music, theater, or other performance; (2) Institutional contribution: Working effectively with others; (3) Institutional contribution: Voting in local, state (provincial), or national (federal) elections; and finally (4) Relaxing and socializing (watching TV, partying, etc.).

After removing these four items, there were three factors with three or more items recording eigenvalues greater than .5. I named the factors Diverse Perspectives, Relationships, and Well-Being based on the wording of the items in the factor (see Table 6). For example, the Diverse Perspectives factor included four NAI items: (1) had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values; (2) had serious conversations with students of a different race or ethnicity than your own; (3) tried to better understand someone else’s views by imaging how an issue looks from his or her perspective; and (4) learned something that changed the way you understand an issue or concept.
Table 6

*Factor Loadings Based on a Principal Component Analysis with Varimax Rotation for 10 items from the NSSE (N = 1997)*

<table>
<thead>
<tr>
<th>NSSE Item</th>
<th>Diverse Perspectives</th>
<th>Relationships</th>
<th>Well-Being</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values</td>
<td>.837</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had serious conversations with students of a different race or ethnicity than your own</td>
<td>.825</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tried to better understand someone else's views by imagining how an issue looks from his or her perspective</td>
<td>.662</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learned something that changed the way you understand an issue or concept</td>
<td>.633</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationships with faculty members</td>
<td>.811</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationships with administrative professionals and offices</td>
<td>.768</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationships with other students</td>
<td>.736</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participated in activities to enhance your spirituality (worship, meditation, prayer, etc.)</td>
<td>.730</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercised or participated in physical fitness activities</td>
<td>.538</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community service or volunteer work</td>
<td>.512</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Factor loadings < .5 were suppressed
Cronbach Alpha Reliability Test

Three factors from the exploratory factor analysis were tested for a Cronbach Alpha reliability score of .70 or higher. Table 7 explains the reliability findings. Two of the three factors scored alphas near .70 (Diverse Perspectives = .75 and Relationships = .68) and could be included in the analysis to answer research question two. The alpha for the third factor, Well-Being (.28) was too low to be included in further analysis.

Variance in Higher Order Thinking Accounted for by the Extracted NAI Factors

Once the two independent factors were determined in the exploratory factor analysis, the data needed to be prepared for the next phase of the study. Composite scores for the new factors (Diverse Perspectives and Relationships) and the HOT score were calculated. Table 8 describes the new range of scores. The Diverse Perspective and HOT composite scores had ranges from 4 to 16. Four was the lowest and 16 was the highest possible composite score. The Relationships composite score ranged from 3-12 where three was the lowest possible composite score and 12 was the highest score. Higher scores were more desirable for this study they represent more involvement in the activities included in the Diverse Perspectives factor and more positive experiences in the Relationships factor. Higher scores in the HOT composite represent more frequent use of advanced thinking skills.

With the data prepared, I conducted a multiple linear regression to determine if variance in students’ higher order thinking was the result of their involvement in non-academic activities that promoted diverse perspectives and relationships with students, faculty, and administrative professionals on campus. Three models were run to understand the greatest impact. The first was a model including both the Diverse Perspective Factor and the Relationship Factor. The second model ran only the Diverse Perspective Factor. Finally, the third model only included the Relationships Factor. The results of all three models appear in Table 9. Model 1 was significant ($F (2, 1909) = 251.095, p = .000$). Student involvement in NAIs related to Diverse Perspectives and Relationships on campus explained 21% of variance in students’ higher order thinking skills.

I ran a second and third model to determine if one of the two factors explained more variance in the regression equation on higher order thinking skills independently. The Model 2 equation was executed by loading the Relationships factor. The result was significant ($F (1, 1944) = 178.141, p = .000$). Students’ relationships on campus with other students, faculty members, and administrative professionals and offices explained 8% of variance in higher order
thinking. The Model 3 regression equation loaded the Diverse Perspectives factor. The result was that students’ non-academic involvement in activities and programs that expose them to Diverse Perspectives explains 17% of variance in higher order thinking skills. The equation was significant ($F (1, 1917) = 378.700, p = .000$). Given the findings, Model 1 (Diverse Perspectives and Relationships) explained the most variance in students’ higher order thinking.

In summary, the results of the data analysis determined that there were two independent factors made up of 7 of the 14 NAI NSSE items. The factors were labeled Diverse Perspectives and Relationships. The combined factors explained a greater portion of variance in HOTs (21%) than either factor explained independently. These findings, and their implications for future practice, research, and policy, are discussed in the next chapter.
Table 7

*Cronbach Alpha Reliability and Descriptive Statistics for Three NSSE Factors (N = 1997)*

<table>
<thead>
<tr>
<th>Factors</th>
<th>No. of items</th>
<th>M (SD)</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverse Perspectives</td>
<td>4</td>
<td>11.30 (2.71)</td>
<td>.75</td>
</tr>
<tr>
<td>Relationships</td>
<td>3</td>
<td>8.20 (2.47)</td>
<td>.68</td>
</tr>
<tr>
<td>Well-being</td>
<td>3</td>
<td>5.86 (1.73)</td>
<td>.28</td>
</tr>
<tr>
<td>Independent Variable (IV)</td>
<td>Introductory Clause</td>
<td>Item</td>
<td>Range of Response</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------</td>
<td>------</td>
<td>-------------------</td>
</tr>
<tr>
<td>DV</td>
<td>During the current school year how much has your coursework emphasized the following mental activities?</td>
<td>Analyzing, Synthesizing, Making judgments, Applying</td>
<td>4-16</td>
</tr>
<tr>
<td>IV</td>
<td>Diverse Perspectives</td>
<td>Had serious conversations with students are very different from you in terms of their religious beliefs, political opinions, or personal values</td>
<td>4-16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Had serious conversations with students of a different race or ethnicity than your own</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tried to better understand someone else’s views by imaging how an issue looks from his or her perspective</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learned something that changed the way you understand an issue or concept</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Relationships</td>
<td>Students’ relationships with faculty members</td>
<td>3-12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students’ relationships with other students</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students’ relationships with administrative professionals and office</td>
<td></td>
</tr>
</tbody>
</table>
### Table 9

**Results of Regression of Diverse Perspectives and Relationships on Higher Order Thinking Skills (N = 1997)**

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>T</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>7.46</td>
<td>.25</td>
<td></td>
<td>29.68*</td>
<td>.21</td>
</tr>
<tr>
<td>Diverse Perspectives</td>
<td>.33</td>
<td>.02</td>
<td>.36</td>
<td>17.35</td>
<td></td>
</tr>
<tr>
<td>Relationships</td>
<td>.22</td>
<td>.02</td>
<td>.22</td>
<td>10.32</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>10.55</td>
<td>.19</td>
<td></td>
<td>56.21*</td>
<td>.08</td>
</tr>
<tr>
<td>Relationships</td>
<td>.29</td>
<td>.02</td>
<td>.29</td>
<td>13.35</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>8.76</td>
<td>.22</td>
<td></td>
<td>39.46*</td>
<td>.17</td>
</tr>
<tr>
<td>Diverse Perspectives</td>
<td>.37</td>
<td>.02</td>
<td>.41</td>
<td>19.46</td>
<td></td>
</tr>
</tbody>
</table>

Notes: p<.05
Chapter 5

Discussion

This study was designed to understand two things. The first was whether there were NAI factors that emerged from items in the NSSE survey. If factors emerged, I was then interested in learning the degree to which those factors explained the variance in students’ higher order thinking skills. I used a national data set of 1,997 NSSE participants who were college seniors, native to their institution and United States citizens. They were of traditional college age and were enrolled full-time.

The purpose of this chapter is to discuss the limitations and findings of the study and compare the findings to those in prior literature. In addition, I offer recommendations for future practice, research, and policy.

Limitations

Before discussing the results, it is important to mention the limitations that came to light while conducting the study. First, I requested that the data slice include responses only from students who were seniors and who were enrolled full-time. My assumption was that full-time students would have had more time to participate in NAIs and more opportunities to develop HOT skills. However, the data only captured student responses at a single point in time. For instance, it is possible that some respondents were enrolled full-time when they completed the NSSE, but had enrolled on a part-time basis during other semesters of their undergraduate career. If this occurred, it might have influenced my results.

The second limitation for this study related to the survey design. There were only so many non-academic activities included in the NSSE survey, therefore the types of activities participants could respond to was limited. If there were more non-academic student involvement items in the survey, perhaps more factors would have emerged or additional items may have been included in the factors discovered in this study.

Another limitation of this study was the self-reported nature of the data. There was no way to account for participants’ mindset as they responded to the survey items designated for purposes of this study as non-academic student involvement. If participants were in an extremely positive or negative frame of mind at the time they completed the NSSE that might have influenced the results.
Another limitation was that the study only used data from the NSSE, a quantitative perspective. I did have any qualitative data to provide depth and understanding to the findings. If I had used a mixed method analysis, the results might be richer and more nuanced.

Finally, this study identified a design feature of the NSSE survey that I considered a limitation. Specifically, there were very few items on the NSSE that measured traditional NAIs like involvement in clubs and organizations, fraternity and sorority life, or residence life. It is possible the inclusion of such items on the NSSE may have led to one or more other factors. Likewise, if there were more items on the NSSE that asked about students’ relationships beyond those with their peers, faculty, and administrative professionals, such as their relationships with family or co-workers, those additional items might have expanded the Relationships factor. This study was limited to the items included in the 2010 NSSE survey. Adding items to the NSSE survey that address more traditional NAIs might provide richer information about what activities explain variance in HOT scores.

**Discussion of the Results**

There were two key findings in this study. The first was related to the first research question posed in this study: whether NAI factors emerge from the NSSE data. To examine this question I conducted an exploratory factor analysis with a varimax rotation. Three factors emerged from that analysis. Based on the wording of the items, I named them Diverse Perspectives, Relationships, and Well-Being. The Diverse Perspectives (.73) and Relationships factors (.68) proved to be sufficiently reliable to be used further in the study. The reliability of the Well-Being factor (.28), however, did not meet the threshold of .70 so was not included in the final analysis.

There were four items included in the Diverse Perspectives factor. The first two items measured the frequency of students’ conversations with a) others of different races or ethnicity from their own and b) peers who were very different from them in terms of religious beliefs, political opinions, and/or personal values. The third item in the Diverse Perspective factor measured the frequency with which students tried to better understand someone else’s views by imaging how an issue looked from that other person’s perspective. The final item measured how frequently students learned something that changed the way they understood an issue or concept.

The Relationships factor consisted of three items. In all instances students identified their relationships with different key constituencies on campus based on a range of response options.
The first item looked at students' relationships with other students. The response options ranged from other students being “unfriendly, unsupportive, and alienating” to being “friendly, supportive, and providing a sense of belonging.” The second item asked students to report on their relationships with faculty. In this case the response options ranged from “unavailable, unhelpful, and unsympathetic” on one end of the scale to “available, helpful, and sympathetic” on the other end. Finally, the third item examined students’ relationships with administrative professionals and offices on campus. Response options ranged from “unhelpful, inconsiderate, and rigid” to “helpful, considerate, and flexible.”

It was interesting to note that the items in the Diverse Perspectives and Relationships factors were not related to traditional non-academic activities. Traditional non-academic involvement usually includes participation in activities like fraternity and sorority life, recreational sports, student government, leadership opportunities, and clubs and organizations. The NSSE included items that asked about some traditional NAIs (e.g., participation in recreational sports), but none of those emerged in the factor analysis. The four items included in the Diverse Perspective factor focused on conversations in which students engaged during their college experience, along with interactions they had that led to their adopting different perspectives. The Relationships factor focused on students’ interactions with peers, faculty, and administrative professionals. The activities included in these two factors are not NAIs in the traditional sense.

The NSSE staff has identified five benchmarks that are available to institutions to compare their results with a comparison group: (1) level of academic challenge; (2) active and collaborative learning; (3) student-faculty interaction; (4) enriching educational experiences; (5) and supportive campus environments (NSSE, 2005). The benchmarks are comprised of items on the survey and since those items do not measure more traditional NAIs, the NSSE may not capture the full spectrum of the collegiate experience.

The second key finding of this study related to the second research question: how much of the variance in students’ higher order thinking is accounted for by the extracted NAI factors. In order to answer this question I ran three multiple linear regression models. The results of the analysis indicated that Diverse Perspectives and Relationships explained a statistically significant portion of the variance in students’ HOT skills. The Diverse Perspectives factor accounted for approximately 17% of variance in students’ higher order thinking skills ($R^2 = .165$). While the
Relationships factor explained approximately 8% of variance in those same HOT skills \( (R^2 = .084) \). When both factors were loaded into the regression model they explained 21% \( (R^2 = .208) \) of the variance in HOT.

Perhaps the most interesting aspect of this finding lies in the fact that it is the combined influence of Diverse Perspectives and Relationships that makes the greatest difference in HOT. This should inform how educators engage with students. For example, if students take a course on religion they are exposed to different philosophies and they will likely have to understand different perspectives if they are to succeed in mastering the class. Including these two elements of Diversity in the course might lead to greater use of HOT. However, if the instructor delivers the content of that class via lecture, so that students do not engage with one another in the classroom (i.e., miss the Relationships factor) the opportunity to maximize HOT may be missed.

Similar scenarios might play out in non-classroom involvement as well. For instance, student conduct officers typically meet one-on-one with students when alleged violations of codes of conduct have occurred. This type of interaction is conducive to increased HOT (Relationship factor). However, if the conversation focuses solely on the student’s behavior and does not require the student to thinks about and/or articulate how that behavior impacted others (Diverse Perspectives) the learning (HOT) that occurs may be less compelling.

Overall, then, the findings of the study are as interesting for what cannot be said about them as for what can be said. That is, none of the traditional NAIs included in the NSSE (e.g., participating in recreational sports or religious activities) were sufficiently associated with one another to emerge as a factor. Likewise, it is the combination of both Diverse Perspectives and Relationships that best promote HOTs rather than either factor acting independently. It would seem that more research is needed to see if a) involvement in more traditional NAIs is associated with higher HOT skills and b) what it is about the interaction of Diverse Perspectives and Relationships that makes such a difference. Indeed, the findings from the study should be considered in the context of prior research.

**Relationships of the Findings to Prior Research**

In prior research, active learning strategies and faculty-student interactions led to students’ higher order thinking skills. Active learning strategies that have been studied include discussion-based learning (Tsui, 2002), collaborative learning strategies (Umbach & Wawrzynski, 2005), and faculty-student interaction where faculty challenge students to rise to an
academic challenge (Umbach & Wawrzynski, 2005). In my study, students had higher HOT scores if they frequently engaged in discussions with a diverse peer group, had the opportunity to engage more frequently with students who shared a different perspective from their own, tried to better understand perspectives other than their own, or learned something new that changed their belief or understanding. If these examples of student engagement are considered active learning strategies, then my study confirms these prior works on active learning and HOTs.

Likewise, in prior studies students engaged in faculty-student interactions, in particular interactions outside the classroom, report enhanced intellectual development (Cotten & Wilson, 2006; Kuh, 1995; Pascarella & Terenzini, 2005). The types of faculty-student interaction that most impact students’ higher order thinking skills are informal conversations with faculty members (Hu & Kuh, 2001), involvement in undergraduate research (Hu, Scheuch, Schwartz, Gayles, & Li, 2008), and academic-based conversations pertaining to their major field of study (Reason, Terenzini, & Domingo, 2007). In my study, students who reported that faculty members are available, helpful, and supportive had higher HOT scores. Assuming that the type of faculty-student interaction included in my study aligns with proxies for student-faculty interaction used in prior research, then my results are consistent with the findings of earlier studies.

Prior research has revealed that student involvement in NAIs leads to several positive outcomes. For instance, students engaged with peers from different racial backgrounds whether through friendships, multicultural student activities, or participation in discussions and programs that expose them to a more global world view see changes in their cultural awareness (Gurin, et al., 2002), understand strengths and weaknesses of their own perspectives (Astin & Antonio, 2004), and develop more inclusive sociopolitical, gender, and racial/ethnic attitudes (Reason, Terenzini, & Domingo, 2006). In my study, students who engaged in these types of NAIs reported higher HOT scores, thus confirming the results of these prior studies.

In addition, prior research has revealed that students who have the ability to make new friends and get socially engaged on campus (Oswald & Clark, 2003) and believe faculty and administrative staff support their academic, personal, and social needs (Belcheir, 2001; Filikins & Doyle, 2002; Reason, et al., 2007; Zhao & Kuh, 2004) report a greater sense of belonging at their institution. My study expanded on the positive outcomes of NAIs by revealing that
relationships students have with their peers, their faculty, and administrative professionals are associated with higher HOTs.

On the other hand, my study neither confirmed nor contradicted the prior research pertaining to students’ approaches to learning and HOTs. Students’ approaches to learning include their motivation to learn and the quality of effort they put forth in their academic endeavors. These approaches to learning impact higher order thinking skills (Chow, 2007; Kaufman & Creamer, 1991). My study did not address these forms of student engagement.

Furthermore, my study neither confirmed nor contradicted prior research pertaining to the outcomes of NAIs that are leadership based, such as involvement in student government (Haber, Allen, Facca, & Shankman, 2012; Kuh & Lund, 1994) or student organizations (Cress, Astin, Zimmerman-Oster, & Burkhardt, 2001), participation in sports and recreation (Hall, Forrester, & Borsz, 2008), and civic engagement (Vogelgesang & Astin, 2005, April). Research has shown that students who take part in these activities increase self-understanding, sense of competence and purpose, and report character development. The NSSE survey did not measure these NAIs; thus my results cannot be interpreted in relation to these other studies.

In summary, my study confirmed prior research about active learning strategies and faculty-student interactions outside the classroom in relation to HOTs. In addition, this study confirmed prior studies about the positive outcomes that occur when students engage in select NAIs. However, the results neither confirm nor contradict other prior studies that explored outcomes associated with NAIs other than HOT.

Implications for Future Practice, Research, and Policy

My results have several implications for future practice, research, and policy. There are two implications for practice stemming from the fact that two NAI factors emerged from NSSE data. First, staff at the Indiana Center for Postsecondary Research, home of the NSSE, may be interested to know that Diverse Perspectives and Relationships factors emerged from a select number of non-academic items on the NSSE. Center staff members may consider additional non-academic items related to Diverse Perspectives and Relationships that could be included in the NSSE survey to provide a more complete understanding about NAIs’ impact on students’ higher order thinking skills.

The second implication stemming from the discovery of two NAI factors is for assessment practitioners. Many campuses have active student assessment programs in place. The
factors related to diverse perspectives and relationships may prove helpful as assessment professionals look for further analyses they can run from NSSE data. For example they might include institutional-specific items on the NSSE that ask students about the clubs and organizations they participate in on campus. They could then use responses to those items, along with data about diverse perspectives and relationships to analyze what sorts of traditional activities (clubs and organizations) may enhance their higher order thinking skills.

The results from my study also revealed that Diverse Perspectives and Relationships explain 21% of variance in students’ HOT scores. This result also has implications for future professional practice. To start, faculty interested in maximizing cognitive gains for students might make note of this finding. When designing classes and pedagogical approaches, faculty might consider blending issues of Diversity and Relationships into their course content. When selecting content, for example, they might pay particular attention to including a range of perspectives on a given issue in the readings they assign (Diversity), or include readings written by scholars from diverse backgrounds. If they then design classroom activities in which students engage with the material by interacting with one another and/or the faculty member (Relationships), they may optimize development of HOTs among students.

The results of my study also have implications for residence life administrators who may seek to contribute to the development of HOT skills by helping students make new connections with their peers. For instance, administrators might create an activity in which students interview one another about backgrounds and beliefs. Such an activity would incorporate social connections (Relationships) with questions about students’ religious beliefs, political opinions, or personal values (Diverse Perspectives). These kinds of interactions might create an environment where students can begin to make deeper connections with their peers. Given the results of this study, this type of activity might also promote the development of higher order thinking skills, as well.

Finally, staff in college recreational services and athletic administrators may be interested in creating activities through sport that promote student-athletes’ higher order thinking skills. Athletic activities tend to draw students from all sorts of backgrounds. Those who participate in recreational sports programs or on varsity athletic teams have the opportunity to create strong relationships with teammates hence to become acquainted with others unlike themselves. Athletic and recreational sports coaches and administrators can build on these peer relationships
by creating intentional conversations among teammates about each other’s experiences and perspectives. For instance, students might participate in a directed conversation focused on their beliefs (Diverse Perspectives) or what they consider to be fair play. This would allow athletes to get to know one another better by reflecting on their own beliefs, listening to the beliefs of others, then engaging in a conversation to establish a shared set of beliefs to guide play. A more sophisticated version of this exercise might involve answering questions such as “Share your thoughts about whether you believe one person can really make a positive difference in the world,” or “What’s one problem affecting society today that you think will be gone 100 years from now?” Student-athletes would learn about each other and be exposed to different perspectives and beliefs when hearing responses to such questions. They then might engage with one another regarding the new perspectives they have heard to more fully understand other points of view. By incorporating a deeper understanding of diverse perspectives into the established relationships that develop by playing sports together, student-athletes may enhance their higher order thinking skills.

Beyond these implications for practice, my study laid the groundwork for future research. To start, I identified NAI factors from the NSSE data and then examined the degree to which those factors explained variance in HOT. It would be interesting to look for other factors that may emerge from the NSSE data and see if they, too, were associated with HOT.

Another interesting idea for future research would be to explore whether students’ exposure to diverse perspectives through avenues other than conversations has an impact on HOT. For example, does involvement in a campus organization predominately comprised of students of a different ethnic background or religious affiliation influence higher order thinking skills? Likewise, future research could look at the linkages between different types of interactions (Relationships) and HOT. For example, are there differences in impact on HOT between student-faculty interactions in the classroom and student-faculty interactions outside the classroom? Likewise, are there differences between interactions with classroom peers versus residence hall peers with respect to HOTs? Additional research might tease out nuances that further enrich the knowledge base about factors that influence HOT skills.

Finally, the results of the study might inform future policy. For example, I found that when faculty members express interest and concern for students they promote HOT. While it is difficult to quantify “interest and concern”, arguably activities like student advising and serving
as the official advisor for a student organization lead to meaningful student-faculty interactions. These kinds of activities might be captured in annual reports that faculty members submit or in materials they prepare for the promotion and tenure process. Those responsible for policies about annual reports and/or promotion and tenure might wish to consider incorporating these types of activities into the reporting process.

My study also might influence enrollment policies. The results revealed that students’ exposure to diverse perspectives and relationships fosters higher order thinking skills. This emphasizes the importance of a diverse student body. Admissions policies that promote the recruitment of a student body from local, regional, state, and international locations may be warranted. For example, institutions may want to create incentives for out of state students to enroll. Alternatively, programs to attract students from low socioeconomic backgrounds might lead to a more diverse student body. Enrolling students from all types of backgrounds increases the chances of exposing students to diverse perspectives.

Finally, policymakers responsible for hiring faculty and staff might find the results of this study important because they emphasize the importance of both relationships and diversity. The findings suggest that the opportunity to learn from a diverse faculty and professional staff might contribute to students’ higher order thinking skills. Human resource policymakers may want to consider how hiring practices and policies impact diversity among faculty and administrative staff. Institutions might want to design policies that promote diversity among applicants. This type of measure may yield a more diverse employee profile.

In conclusion, higher education stakeholders are increasingly identifying what they expect of college graduates and demanding evidence that students are achieving those outcomes. Critical thinking is often at the top of that list of outcomes and higher order thinking skills lead to critical thinking. My study revealed that exposing students to diverse perspectives and ensuring that they engage with faculty, administrators, and other students promote higher order thinking. Campus leaders would be well served to promote these types of activities as they strive to maximize outcomes for undergraduates.
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Appendix A: Institutional Review Board Approval Letter

Virginia Tech
Office of Research Compliance
Institutional Review Board
North End Center, Suite 4120, Virginia Tech
300 Turner Street NW
Blacksburg, Virginia 24061
540/231-4606 Fax 540/231-0959
e-mail irb@vt.edu
website http://www.irb.vt.edu

MEMORANDUM
DATE: July 22, 2013
TO: Joan D Illt, Megan Ambruster
FROM: Virginia Tech Institutional Review Board (FWA00000572, expires April 25, 2018)
PROTOCOL TITLE: The Impact of Non-Academic Involvement on Students’ Higher Order Thinking
IRB NUMBER: 13-647

Effective July 22, 2013, the Virginia Tech Institution Review Board (IRB) Chair, David M Moore, approved the New Application request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

http://www.irb.vt.edu/pages/responsibilities.htm

(Please review responsibilities before the commencement of your research.)

PROTOCOL INFORMATION:
Approved As: Exempt, under 45 CFR 46.110 category(ies) 4
Protocol Approval Date: July 22, 2013
Protocol Expiration Date: N/A
Continuing Review Due Date: N/A

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:
Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/ work statements to the IRB protocol(s) which cover the human research activities included in the proposal/ work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.