Advances in Social Sciences Research Journal – Vol.1, No.5
Publication Date: September 15, 2014
DOI: 10.14738/assrj.15.439
Sahbaz, S., Culver, S. M., & Burge, P. L. (2014). College Students' Perceptions of their Core Competencies: An Institutional Analysis of Discipline and Gender. *Advances in Social Sciences Research Journal, 1*(5), 123-135

College Students' Perceptions of their Core Competencies: An Institutional Analysis of Discipline and Gender

Sumeyra Sahbaz
Doctoral Candidate, Educational Research & Evaluation
Virginia Tech

Steven M. Culver
Assistant Provost for Assessment and Evaluation
Virginia Tech

Penny L. Burge
Professor, Educational Research & Evaluation
Virginia Tech

ABSTRACT

In this study we examined the perceptions of 1,852 senior college students' knowledge, skills, and abilities as freshmen and as seniors at a large research-intensive university in the southeastern United States. From a list of twelve core skills (e.g., critical thinking, writing, oral communication, leadership), we examined the underlying factors at both freshman and senior levels and explored differences by gender and by academic discipline. Using principal components factor analysis two distinct dimensions were extracted: (1) collaborative learning skills and (2) personal development. Using multiple multivariate analyses of variance (MANOVA), we found significant differences between male and female students in their perception of their skills and abilities both as entering and graduating college students in their oral communication skills, interpersonal skills and their ability to communicate with people different from themselves. Students from different academic disciplines (Engineering, Business, and Liberal Arts and Human Sciences) tended to perceive their proficiency level differently in terms of their interpersonal skills, leadership skills and ability to communicate with people different from themselves. Knowing areas where students differ in their skills and abilities can help faculty, administrators, and staff to re-examine curricula and to offer opportunities for all students to realize the personal, social, economic, and occupational benefits of a college education.

Keywords: higher education, student learning outcomes, academic discipline, gender, student surveys

INTRODUCTION

Although colleges and universities vary in their missions and the students they serve, they all have the common goal of offering students diverse and engaging experiences that are intended to transform them into "educated persons" (Neem, 2013). Since the rise of accountability and assessment processes in higher education, the focus of this transformation has become what the student is learning, rather than what the faculty may be teaching or what the curriculum seems to dictate (Maki, 2004). This focus on student learning has resulted in changes in what regional accrediting bodies and disciplinary accrediting bodies want to see as evidence of quality educational processes, evidence that students have demonstrated specific outcomes

(Ewell, 2009). Regardless of institutional type or discipline, the American Association of Colleges and Universities has highlighted "essential learning outcomes" (AAC&U, 2007) that all students are supposed to learn. This listing was developed through a multiyear dialogue with hundreds of colleges and universities, analysis of a long series of recommendations and reports from the business community, and analysis of the accreditation requirements for engineering, business, nursing, and teacher education. The findings are documented in several publications, including *Association of American Colleges and Universities: Greater Expectations: A New Vision for Learning as a Nation Goes to College* (2002), *Taking Responsibility for the Quality of the Baccalaureate Degree* (2004), and *College Learning for the New Global Century* (2007).

These core outcomes relate to critical thinking, written communication, oral communications, teamwork, problem solving, or other similar skills. Specifically, the essential learning outcomes include "intellectual and practical skills, including inquiry and analysis, critical and creative thinking, written and oral communication, quantitative literacy, information literacy, and teamwork and problem solving." In addition, students should develop outcomes related to personal and social responsibility, including civic knowledge, intercultural knowledge, ethical reasoning, and skills for lifelong learning. Furthermore, students should demonstrate knowledge of human cultures and the physical and natural world (AAC&U, 2007). These outcomes are similar to those noted by others (e.g., Dugan &Komives, 2010; Ewell, 2013; Lord, et al., 2012). Additional outcomes cited as central to the educational mission include engagement and persistence (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2007). Publicized concerns from employers also focus on these "core skills" that graduating students may or may not possess (Kuh & Ewell, 2010).

Most universities have responded to these concerns by more clearly articulating the general education segment of their degree programs. In addition, academic programs, in noting the skills and abilities of their graduates, typically include writing and oral communication, critical thinking, and knowledge of the subject matter as outcomes that derive from their students' engagement in the major. To provide evidence of whether these students possess these skills and abilities, standardized tests are used, locally developed instruments are administered, surveys are sent, and portfolios adjudicated by faculty-scored rubrics provide information for improvement and for accountability purposes (Kuh & Ewell, 2010). Universities are now being compared on the results of student performance, as well as student-faculty ratios and number of PhDs on faculty.

Despite this focus on "core" elements as the measure of a university's quality, there is some research that suggests that factors, other than university-level activities, are responsible for how these core elements are perceived. In fact, focusing on the university suggests a high level of consistency in students' experiences and may misrepresent the experiences of most students, particularly those who come from larger institutions that offer a greater diversity of educational programs (Jones, 2008). Rather than the university as the level of analysis, some researchers (e.g., Chatman, 2007) have suggested that academic discipline is a determiner of how students view and understand these skills. In addition, there is evidence that suggests that gender also affects the perception and measurement of these skills (Gasiewski, Eagan, Garcia, Hurtado, & Chang, 2012). Complicating this relationship is the continued persistence of gendered majors within the university (Sax, Jacobs, & Riggers, 2010; Zafar, 2013).

Colleges consist of different disciplines and individuals in these disciplines differ in terms of their expectations, perceptions, as well as their learning outcomes (Pike & Killian, 2001; Pike, 1992; Li, Long & Simpson, 1999). Indoctrination with particular academic disciplines

influences students' academic orientations, expectations, and perceptions of the college environment (Feldman, Smart, & Ethington, 1999; Jones, 2011; Pascarella, 2006). Evidence of how these traits vary by discipline includes measures of students' different abilities in different areas. For example, Jones (2009), using in-depth, semi-structured interviews with academic staff in five disciplines – physics, history, economics, medicine and law – found that skills such as critical thinking, analysis, problem solving and communication are conceptualized and taught in quite different ways in each of the disciplines. It is not surprising then that investigations into critical thinking and problem solving suggest that students in disciplines such as engineering and science demonstrate critical thinking at higher levels than those students majoring in education and the arts (Astin, 1993). Other researchers (Douglass, Thomson, Zhao, 2012; Pascarella, 1976: Steedle & Bradley, 2012), too, have found that disciplinary perspectives tend to affect measures of student achievement.

In addition to academic discipline, gender is a variable found in the literature to be strongly related to students' engagement, learning, and perceptions of their college experiences. For example, in a mixed methods study focused on students in introductory science, technology, engineering, and mathematics (STEM) courses across 15 colleges and universities, Gasiewski, Eagan, Garcia, Hurtado, & Chang, 2012) found that students' learning is affected by how comfortable they feel in class, in seeking out tutoring, in attending supplemental instruction sessions, and in collaborating with other students. Comfort level was influenced by student gender and by the perceived openness of the instructor. In a related study (Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012), when faculty in the sciences were asked to rate applicants of equal qualifications, male applicants were judged to be more competent and hirable, by both male and female faculty. In a comprehensive review of the literature on student participation in college classrooms, a key factor related to engagement and student learning, Rocca (2010) found that across the majority of disciplinary areas, women are less likely than their male counterparts to be active participants in the classroom, potentially affecting their learning and their grades. Faculty interactions with students were found to differ by gender at several large research universities (Kim & Sax, 2009). In an interesting observational study by Tatum, Schwartz, Schimmoeller, and Perry (2013), as the percentage of male students increased in a classroom, overall voluntary responses and praise from the professor decreased.

Given such differences it may not be surprising that male and female students vary in terms of their expectations from a college education and the outcomes that they value. For example, in their study, Wawryznski and Sedlacek (2003) determined that acquiring effective written and oral communication skills were more important to female students than they were for male students, while learning to think and reason and developing leadership skills were more important for male students. Female students also put more value on a college education that enables them to appreciate attitudes and cultures different from their own. In addition, studies (e.g., Bowman, 2010) have documented lower levels of psychological well being among female first-year college students, a construct related to sense of belonging and social adjustment to college. In addition, lower levels of self-efficacy, related to learning and college persistence, have been associated with female sophomore students (Vuong, Brown-Welty, & Tracz, 2010). In short, on many inter-related levels, gender has been documented as shaping learning, student engagement, and the college experience (Kim & Sax, 2007; Nora, Cabrera, Hagedom, & Pascarella, 1996; Pascarella, 2006; Pascarella & Terenzini, 1991).

Purpose Statement

At a large research-intensive university, graduating seniors are asked to complete a survey that asks about their perceptions of a number of these core skills identified by AAC&U and others.

Specifically they are asked about their current level of competence after nearly completing their undergraduate education and they also asked to reflect back on their perceived level of competence when they first entered the university. These student responses were used to gain a comprehensive picture of undergraduate learning outcomes at this university and to answer the following research questions: (1) How are the dimensions of undergraduate learning outcomes defined for this group of students? (2) How do these students perceive their level of skills and abilities as entering freshmen and exiting seniors? (3) Do these learning outcomes differ for female and male students and for those from different academic disciplines?

METHODS

Instrument

A 40-item web-based survey was administered in early spring 2013 to all graduating senior students at a large southeastern land-grant university in the United States. The purpose of the survey, approved by the university's institutional review board (IRB), was to gather information regarding students' perceptions of their collegiate experiences as they related to teaching and learning in their major and across the university. Survey items were derived from the literature and from faculty input; the survey was pilot-tested and reviewed by a panel of evaluation specialists and graduate students in Educational Research and Evaluation. Of 4,218 students invited to participate in the survey, 1,852 responded, resulting in a response rate of 43.9%. Of these, 51% were female; 82% identified as white (non-Hispanic) and 6% as Asian/Pacific Islander. About 60% reported their current GPA as greater than 3.00.

Two survey items of interest in this study asked for students' perceptions of their beginning collegiate skill levels: "Below are skills and abilities that a graduating senior, regardless of major, might possess. Please indicate the level of proficiency you believe you had when you entered the university". The other asked for students' perceptions of their current skill levels: "Below are skills and abilities that a graduating senior, regardless of major, might possess. Please indicate your current level of proficiency." These items were designed to provide a cross sectional method to evaluate perceived longitudinal gains in twelve different areas. These areas were written communication skills, oral communication skills, critical thinking/analysis, computer/technology skills, interpersonal (social) skills, leadership skills, organizational ability, ability to work in teams to solve problems, ethical reasoning, ability to work across disciplines, knowledge of global issues, ability to communicate with people different from yourself.

Another item of interest on the survey was the student's major. For this item, students were provided with a drop down menu of all undergraduate majors at the university. Students were asked to indicate their primary major (for those with double or triple majors, they were only allowed to choose what they considered to be their "primary" major). These responses were used to categorize students into three disciplinary groups: Engineering, Liberal Arts and Human Sciences, and Business. Students who could not be classified in these areas were excluded from further analyses.

Procedures

Because the twelve student competencies appear to be closely related (e.g., critical thinking and organizational ability), an exploratory factor analysis (EFA) was conducted to determine if underlying constructs defined manifest items on the two survey questions related to student skills and abilities. An EFA was conducted for each of the two sets (current skill level and perceived skill level at beginning of college) of questions related to students' skills and abilities.

After the factor structure of the two sets of items was explored, reliability analysis was conducted in order to determine the internal consistency of each factor. Following the reliability analysis, a multivariate analysis of variance (MANOVA) was employed to examine the differences in the means of the items of extracted factors at two time points: students' beginning of college experience and students' impending graduation from college. In the MANOVA, gender and study discipline were used as independent variables and the resulting factors derived from the twelve core skills were the dependent variables. The purpose of the MANOVAs was to examine differences of students' perceptions of their skills and abilities by students' gender and study discipline.

RESULTS

Table 1a presents students' responses to each of the twelve core knowledge, skills, and abilities seen as central to student learning in higher education. Shown are students responses to the two questions, asking for their perceptions of their skills and abilities "when you entered the university" and "your current level."

Table 1a: Students' perceptions of their proficiency level in twelve skills and abilities

Below are skills and abilities that a graduating university senior, regardless of major, might possess. Please indicate the level of proficiency you believe you had when you entered the university and your current level of proficiency.

	Your proficiency when you entered					Your Current level of proficiency				
	Very low	Low	Ave.	Above Ave.	Mean (SD)	Very low	Low	Ave.	Above Ave.	Mean (SD)
Written communication skills	2%	9%	55%	34%	3.2 (0.67)	0%	1%	38%	61%	3.6 (0.52)
Oral communication skills	3%	24%	53%	20%	2.9 (0.74)	0%	2%	41%	56%	3.5 (0.55)
Critical thinking/analysis skills	1%	12%	59%	27%	3.1 (0.65)	0%	1%	24%	75%	3.7 (0.46)
Computer/technology skills	3%	21%	59%	18%	2.9 (0.70)	0%	4%	46%	50%	3.5 (0.59)
Interpersonal (social) skills	2%	15%	52%	31%	3.1 (0.72)	0%	3%	36%	61%	3.6 (0.56)
Leadership skills	3%	19%	54%	24%	3.0 (0.75)	0%	3%	39%	57%	3.5 (0.58)
Organizational ability	4%	19%	46%	31%	3.1 (0.80)	0%	5%	35%	60%	3.6 (0.60)
Ability to work in teams to solve problems	1%	13%	62%	23%	3.1 (0.64)	0%	1%	33%	65%	3.6 (0.52)
Ethical reasoning	1%	11%	57%	32%	3.2 (0.65)	0%	1%	38%	61%	3.6 (0.53)
Ability to work across disciplines	1%	16%	63%	20%	3.0 (0.63)	0%	2%	44%	55%	3.5 (0.54)
Knowledge of global issues	9%	41%	39%	11%	2.5 (0.81)	1%	10%	45%	43%	3.3 (0.70)
Ability to communicate with people different from yourself	2%	14%	56%	28%	3.1 (0.69)	0%	1%	34%	65%	3.6 (0.51)

Note. Mean is calculated on 4-point scale where Very Low = 1 and Above Average = 4 (n = 1747 to 1752, depending on item)

As shown in Table 1a, 89% of the students perceive their written communication skill as they entered the university to be average or above average. As graduating seniors, 99% believe their written communication skills to be average or above average. Similar increases in perceptions of skills can also be observed for students' oral communication skills, critical thinking/analysis skills, interpersonal/social skills, leadership skills, organizational ability, computer/technology skills, and their ability to communicate with people different from themselves. Similar increases were demonstrated for knowledge of global issues, though students' perceptions of their abilities in this area upon college entry were lower than the other areas listed. Consequently, they were also lower when students were at the end of their college years.

Exploratory Factor Analysis (EFA)

Given the related nature of these skills and abilities, we considered the possibility of an underlying structure among this set of items. However, before conducting an exploratory factor analysis, the assumptions for EFA were tested in order to examine the suitability of the data for this type of analysis. Initially, the Kaiser-Meyer-Olkin index of sampling adequacy was used to assist with the examination of the factorability of each of the two item sets. This index was .86 for responses at both the entering student and graduating student levels, above the commonly recommended value of .60. In addition, Bartlett's test of sphericity was significant for the first set of items (χ^2 (66,1750) = 4707.56,p < .001) and for the second set (χ^2 (66,1720) = 3986.53, p < .001), indicating that the correlation matrices are suitable for factor analysis.

Given these overall indicators, factor analysis was deemed to be suitable with all 12 skills for each item (student perceptions as entering freshmen and student perceptions as graduating seniors). Principal axis factor analysis with Promax rotation was used to extract the factors with eigenvalues greater than or equal to 1.0. For the first survey question (asking students' their perceived competency level on the 12 skills as entering freshmen), the analysis yielded three factors, with eigenvalues of 3.98, 1.30, and 1.0. Items were retained if their primary factor loading was at least .50 with no cross-loading of .30 or above. The three factors extracted accounted for 52.5% of the total variance for the entire set of skills. These factors we labeled as Collaborative Learning Skills, with 5 items and a Cronbach's reliability of .71; Personal Development, with three items and a Cronbach's reliability of.52; and Intellectual Skills with three items and a Cronbach's reliability of .53. Table 2 presents the rotated factor matrix/pattern matrix for this item, showing which skills loaded on which factor.

Based on the results presented in table on next page, five items load on factor 1 with loading greater than .5 and these items are: (1) organizational ability (2) ability to work in teams to solve problems (3) ethical reasoning (4) ability to work across disciplines, and (5) ability to communicate with people different from themselves.

The same procedure was followed to extract the factors underlying the second survey question asking about students' perceptions of their skills and ability level as they graduate from the university. Principal axis factor analysis was applied to the second item – students' perceptions of their current competency levels across the 12 skills. As with the first item, factors with eigenvalues greater than or equal to 1.0 were retained, and after Promax rotation, the analysis yielded two factors, with eigenvalues of 3.78 and 1.20. This analysis resulted in two factors that accounted for 41.6% of the total variance for the entire set of skills. These factors we have labeled as Collaborative Learning, with four items and a Cronbach's reliability of .73; and Individual Development, with four items and a Cronbach's reliability of .55. Table 3 presents the resulting rotated factor matrix, showing which skills loaded on which of the two factors.

Table 1: Results of EFA for student perceptions of skills as freshmen

	Factors		
	1 Collaborative Learning skills	2 Personal Development	3 Intellectual Skills
Skills and Abilities			
Written Communication Skills	-.049	-.286	.615
Oral Communication Skills	-.081	-.711	.373
Critical Thinking/analysis Skills	.155	-.020	.706
Computer/technology Skills	.084	.083	.624
Interpersonal/social Skills	.180	-.754	-.121
Leadership Skills	.136	-.739	.012
Organizational Ability	**.595**	-.119	-.141
Ability to work in teams to solve problems	**.672**	-.190	-.101
Ethical Reasoning	**.696**	.178	.159
Ability to work across disciplines	**.672**	.049	.182
Knowledge of global issues	.455	.060	.299
Ability to communicate with people different from yourself	**.612**	-.178	.020

Note. Primary factor loadings are in bold.
Percentage of variance explained: Factor 1 (33.2%), Factor 2 (10.8%), and Factor 3 (8.4%).

Table 1: Results of EFA for student perceptions of skills as graduating seniors

	Factors	
	1 Collaborative Learning	2 Individual Development
Skills and Abilities		
Written Communication Skills	.129	.429
Oral Communication Skills	**.665**	.049
Critical Thinking/analysis Skills	-.070	.728
Computer/technology Skills	-.191	.673
Interpersonal/social Skills	**.832**	-.145
Leadership Skills	**.740**	-.049
Organizational Ability	.478	.017
Ability to work in teams to solve problems	.456	.238
Ethical Reasoning	.264	.474
Ability to work across disciplines	.242	.563
Knowledge of global issues	.114	.500
Ability to communicate with people different from yourself	**.602**	.183

Note. Primary factor loadings are in bold.
Percentage of variance explained: Factor 1 (31.5%) and Factor 2 (10.0%).

According to the factor matrix four items load on factor one and these are: (1) oral communication skills (2) interpersonal (social) skills (3) leadership skills and (4) ability to communicate with people different from themselves. In both of the survey questions the predominant factor consisted of skills and abilities related to collaborative learning. Relying on the existing literature these factors consisting of certain skills and abilities were labeled as

Collaborative Learning Skills. This particular factor, derived from both sets of respondents (incoming freshman and graduating senior), was the focus of the present study.

Multivariate Analysis of Variance

Multivariate analyses of variance (MANOVA) were conducted to examine differences among students' perceptions of their proficiency level of the listed skills and abilities. Separate MANOVAs were utilized for the first and second survey questions, one asking about students' perceptions of their skills and ability level as they entered the university and another one asking about student current proficiency level of certain skills and abilities. In each case, the items of interest were the ones that loaded on the factor, Collaborative Learning. These were examined for differences in students' perceptions due to their gender and to their academic discipline. So for each survey question two MANOVAs were conducted, one to explore gender differences and another one to explore the differences by study discipline.

The first MANOVA examined the effects of gender on entering female ($n = 848$)and male ($n = 821$) college students' perceived skills and abilities. The MANOVA results revealed strong statistically significant differences for the items listed above, $Wilk's\ Lambda = .93, F(5, 1663) = 26.30, p < .01$ between different gender groups. When the results for the dependent variables were examined separately, there were statistically significant differences found between entering male and female students' perceived organizational skills $F(5, 1663) = 113.09, p < .01$, ability to work in teams to solve problems $F(5, 1663) = 15.48, p < .01$, and ability to communicate with people different from yourself $F(5, 1663) = 11.39, p < .01$. Post-hoc analyses helped us to reveal that in each of these three skills female students' perceptions were significantly higher than those of male students.

The next MANOVA was used to examine differences in type of academic study discipline for entering Engineering (n=419), Business (n=263), and Liberal Arts and Human Sciences (n=373) on students' perceived skills and abilities. The MANOVA results revealed strong statistically significant differences for these skills and abilities, $Wilk's\ Lambda = .97, F(5, 1048) = 3.21, p < .01$ between different study discipline students. When the results for the dependent variables were examined separately, statistically significant differences were found between entering Engineering, Business, and Liberal Arts and Human Sciences students' perceived organizational skills $F(5, 1048) = 3.26, p < .05$, ability to work in teams to solve problems $F(5, 1048) = 4.98, p < .01$, ethical reasoning $F(5, 1048) = 4.40, p < .01$. Post-hoc analyses ($p<.05$) revealed that Business students perceive their organizational ability to be significantly higher than students enrolled in Engineering, while there is no significant different between Engineering and students of Liberal Arts and Human Sciences. Liberal Arts and Human Sciences students perceive their ability to work in teams to solve problems significantly higher than the other two groups of students. Finally Business students perceive their ethical reasoning significantly higher than the other student of Engineering and Liberal Arts and Human Sciences. Summary results of these two MANOVAs are shown in Table 4.

Table 2: MANOVA results of students' perceptions of proficiency levels as freshmen by gender and student discipline

	By Gender		By Study Discipline	
	F	*p<.05*	*F*	*p<.05*
Students' Skills and Abilities				
Organizational Ability	113.09	*	3.26	*
Ability to work in teams to solve problems	15.48	*	4.98	*
Ethical Reasoning	.38		4.40	*
Ability to work across disciplines	3.20		1.04	
Ability to communicate with people different from yourself	11.39	*	2.08	

Note. An asterisk (*) indicates significant different among groups

To explore students' perceptions of their skills and abilities as they graduate from the university two MANOVAs were conducted. The first MANOVA examined gender differences of graduating female ($n = 835$) and male ($n = 815$) students. The MANOVA results revealed statistically significant differences ($Wilk's\ Lambda = .973, F(4, 1645) = 11.23, p < .01$) between students of different gender. Statistically significant differences found between graduating male and female students' perceived oral communication skills $F(5, 1645) = 6.94, p < .01$, interpersonal (social) skills $F(5, 1645) = 14.52\ p < .01$, and ability to communicate with people different from yourself $F(5, 1645) = 8.73, p < .01$. Post-hoc analyses (p<.05) helped us to reveal that graduating female students perceive their interpersonal skills and their ability to communicate with people different from themselves to be significantly higher; male students, on the other hand, tend to perceive their oral communication skills as significantly higher than female students.

The second MANOVA examined differences in the perceptions of graduating students from different disciplines (Engineering (n=414), Business (n=261), and Liberal Arts and Human Sciences (n=371). The MANOVA results revealed statistically significant differences ($Wilk's\ Lambda = .929, F(4, 2080) = 9.76, p < .01$) between students of different academic study disciplines in their interpersonal (social) skills $F(4, 2080) = 25.96, p < .01$, leadership skills $F(4, 2080) = 7.80, p < .01$, and ability to communicate with people different from yourself $F(4, 2080) = 16.35, p < .01$. Post-hoc analyses p<.05) indicated that Engineering students perceive their interpersonal skills and their ability to communicate with people different from themselves significantly as lower than students from either Business or Liberal Arts and Human Sciences. Business students tend to perceive their leadership skills as significantly higher than the other two groups of students. Results of these two MANOVAs are presented in Table 5.

Table 3 :MANOVA results of students' perceptions of proficiency levels at graduation by gender and student discipline

	By Gender		By Study Discipline	
	F	*p<.05*	*F*	*p<.05*
Students' Skills and Abilities				
Oral Communication Skills	6.94	*	2.04	
Interpersonal (Social) Skills	14.52	*	25.96	*
Leadership Skills	.251		7.80	*
Ability to communicate with people different from yourself	8.73	*	16.35	*

Note. An asterisk (*) indicates significant different among groups

CONCLUSION

Both the exploratory factor analysis and multivariate analyses of variance demonstrate clear differences between students' perceptions of their knowledge, skills, and abilities when they enter college and when they are about to graduate from college. Results also indicate that these perceptions vary, based on their gender and academic discipline. Graduating senior students demonstrate differing levels of oral communication skills, interpersonal/social skills, and their ability to communicate with people different from themselves. According to the study results, students in Engineering fields perceived many of their skills and abilities as lower than students in Liberal Arts and Human Sciences or Business. Specifically, Engineering students reported significantly lower scores in interpersonal skills, leadership skills, organizational skills, ethical reasoning and their ability to communicate with people different from themselves.

Moreover, results indicate that female students report higher scores in their level of interpersonal skills, organizational skills, ability to work in team to solve problems, and their ability to communicate with people different from themselves. However, male students reported higher perceived scores in oral communication skills. Further analyses examining the factor structure of the two items mentioned above revealed that male and female college students vary in terms of how they regard their skills and abilities. When gender was included in the analyses both the number of factors and the interpretation of the factors was different for the two gender groups.

These results support the results of previous studies that indicate both gender (Pascarella, 2006; Rocca, 2010: Tatum, Schwartz, Schimmoeller, & Perry, 2013) and academic discipline (Chatman, 2007; Jones, 2008) shape students' perceptions. The continued persistence of gendered majors within the university (Sax, Jacobs, & Riggers, 2010; Zafar, 2013) complicates this relationship.

These study results provide information that may be useful to university administrators and faculty. Key skills and abilities, such as communication skills, critical thinking, computer skills, and leadership skills are inter-related and cannot be developed in isolation. These findings may guide faculty in their development of classroom and co-curricular activities. This study revealed the factor structure of perceptions of students related to their core skills and abilities as they enter and leave the university. These core factors are seen by many (AAC&U, 2007; Dugan & Komives, 2010; Ewell, 2013; Lord, et al., 2012) as related to skills needed to work within a community or a group and skills needed for personal development. Results indicated that the structure of the first item asking about the skills and abilities possessed by entering students could be explained by three factors whereas two factors were enough to explain the structure of the second item asking about skills and abilities possessed by senior students. These conclusions indicate that college students regard their level of proficiency differently as entering and exiting students.

Both faculty and institutions may regard these differences in order to help college students improve their skills and abilities by considering gender differences. This study focuses on how, based on students' responses, these skill areas may be grouped. Knowing areas where students feel they have made lesser gains than in other areas can help faculty, administrators, and staff to re-examine curricula and to offer more focused educational opportunities for maximum student benefit. Further research is needed to study why the students of different academic disciplines and gender differ significantly in their perceptions of their skills and abilities.

The focus of this study was on college students' perception differences of their skills and abilities as they reflected back to the time they entered the university and by the time they graduated from the college. The sample for this study is limited to college seniors at only one large, research-intensive university. Students may not reflect the same attitudes and perceptions as students at other college and universities in the United States or elsewhere. Different perceptions may be indicated from students of non-research-intensive universities and gender and study discipline differences may look different dependent on the mission and student body of the college or university. Furthermore the current study used self-reported data by students and did not have access to information regarding the nature of students' collaborative activities or the role they assumed. So the data represent and indirect measure of what students report rather than a direct measure of their skills. Future researchers may use direct measures to compare students in terms of their collaborative learning skills and not to limit the sample selection to one university.

References

Association of American Colleges and Universities. (2007). *College learning for the new global century*. Washington, DC: AAC&U.

Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco, CA: Jossey Bass.

Bowman, N. A. (2010).The development of psychological well-being among first-year college students. *Journal of College Student Development, 51,* 2, 180-200.

Chatman, S. (2007). *Institutional versus academic discipline measures of student experience: A matter of relative validity.* Center for Studies in Higher Education Research & Occasional Paper Series, CSHE.8.07. Berkeley: University of California.

Douglass, J. A., Thomson, G., & Zhao, C-M. (2012). The learning outcomes race: The value of self-reported gains in large research universities. *Higher Education, 64,* 317-335.

Dugan, J. P., & Komives, S. (2010). Influences on college students' capacities for socially responsible leadership. *Journal of College Student Development, 51,* 5, 525-549.

Ewell, P. T. (2009). *Assessment, accountability, and improvement.*(Occasional Paper No. 1). Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment.

Ewell, P. (2013). *The Lumina Degree Qualifications Profile (DQP): Implications for Assessment.*(Occasional Paper No.16). Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment.

Feldman, K. A., Smart, J. C, & Ethington, C. A. (1999). Major field and person-environment fit: using Holland's theory to study change and stability of college students. *Journal of Higher Education, 70*(6), 642-669.

Gasiewski, J. A., Eagan, M. K., Garcia, G. A., Hurtado, S., & Chang, M. J. (2012). From gatekeeping to engagement: A multicontextual, mixed method study of student academic engagement in introductory STEM courses. *Research in Higher Education, 53,* 229-261.

Jones, A. (2009). Redisciplining generic attributes: the disciplinary context in focus.*Studies in Higher Education, 34,* 85-100.

Jones, G. A. (2008). Can provincial universities be global institutions? Rethinking the institution as the unit of analysis in the study of globalization and higher education. *Higher Education Policy, 21,* 457-468.

Jones, W. A. (2011). Variation among academic disciplines: An update on analytical frameworks and research. *The Journal of the Professoriate*, *6,* 1, 9-27.

Kim, Y. K., & Sax, L. (2007). Different patterns of student-faculty interaction in research universities: An analysis by student gender, race, SES, and first-generation status. Berkeley, CA: Center for Studies in Higher Education, pp. 1-20.

Kim, Y. K., & Sax, L. (2009). Student–faculty interaction in research universities: Differences by student gender, race, social class, and first-generation status. *Research in Higher Education*, 50, 437-459.

Kuh, G. D., Kinzie, J., Buckley, J., Bridges, B., & Hayek, J. C. (2007).Piecing together the student success puzzle: Research, propositions, and recommendations.*ASHE Higher Education Report, 32* (5). San Francisco, CA: Jossey-Bass.

Kuh, G.D., &Ewell, P. T. (2010). The state of learning outcomes assessment in the United States. *Higher Education Management and Policy, 22, 1,* 9-28.

Li, G., Long, S., & Simpson, M. E. (1999). Self-perceived gains in critical thinking and communication skills: Are there disciplinary differences. *Research in Higher Education, 40*(1), 43-60.

Lord, S. M., Prince, M. J., Stefanou, C. R., Stolk, J. D., & Chen, J. C. (2012). The effect of different active learning environments on student outcomes related to lifelong learning.Paper 15 http://digitalcommons.olin.edu/facpub_2012/15

Maki, P. L. (2004). Assessing for learning: Building a sustainable commitment across the Institution. Sterling, VA: Stylus.

Moss-Racusin, C., Dovidio, J. F., Brescoll,V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *Proceedings of the National Academy of Sciences, 109,* 41, 16474-16479.

Neem, J. N. (2013). Experience matters: Why competency-based education will not replace seat time. *Liberal Education, 99,* 4, 26-29.

Nora, A., Cabrera, A., Hagedom, L. S., & Pascarella, E. (1996).Differential impacts of academic and social experiences on college-related behavioral outcomes across different ethnic and gender groups at four-year institutions. *Research in Higher Education, 37*(4), 427-45.

Pascarella, E.T. (1976). Perceptions of the college environment by students in different academic majors in two colleges of arts and sciences. *Research in Higher Education, 4*(2), 165-176.

Pascarella, E. T. (2006). How college affects students: Ten directions for future research. *Journal of College Student Development, 47,* 5, 508-520.

Pascarella, E. T., &Terenzini, P. T. (1991). How college affects students: Findings and insights from twenty years of research. San Francisco, CA: Jossey-Bass.

Pike, G. R. (1992). Using mixed-effect structural equation models to study student growth and development. *Review of Higher Education 15*(2), 151-177.

Pike, G. R., & Killian, T. (2001). Reported gains in student learning: Do academic disciplines make a difference? *Research in Higher Education, 42,* 117-139.

Ramaley, J., & Leskes, A. (2002). *Greater Expectations: A new vision for learning as a nation goes to college*. National Panel Report, Washington, DC: Association of American Colleges and Universities.

Rocca, K. A. (2010). Student participation in the college classroom: An extended multidisciplinary literature review. *Communication Education, 59,* 2, 185-213.

Sax, L. J., Jacobs, J. A., & Riggers, T. A. (2010). Women's representation in science and technology (STEM) fields of study. Paper presented at the annual meeting of the Association for the Study of Higher Education, Indianapolis, IN.

Steedle, J., & Bradley, M. (2012). Majors matter: Differential performance on a test of general college outcomes. Paper presented at the Annual Meeting of the American Educational Research Association, Vancouver, Canada.

Tatum, H. E., Schwartz, B. M., Schimmoeller, P. A., & Perry, N. (2013). Classroom participation and student-faculty interactions: Does gender matter? *The Journal of Higher Education, 84,* 6, 745-768.

Vuong, M., Brown-Welty, S., & Trac, S. (2010). The effects of self-efficacy on academic success of first-generation college sophomore students. *Journal of College Student Development, 51,* 1, 50-64.

Wawrzynski, M. R., &Sedlacek, W. E. (2003). Race and gender differences in the transfer student experience. *Journal of College Student Development, 44*(4), 489-501.

Zafar, B. (2013). College major choice and the gender gap. *Journal of Human Resources, 48,* 3, 545-595.

