

# How Prepared are Undergraduates for a Career?

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## Abstract

An online survey was conducted from 2004 to 2013 to ascertain graduating seniors' perceptions of their career preparedness learning outcomes in the College of Agriculture and Natural Resources (CANR) at Michigan State University. Seniors who participated in the survey perceived that their coursework and departmental/school services contributed moderately to considerably to attaining their learning outcomes and their perceptions of career preparedness improved over the years. Knowledge applicable to their anticipated career path received the highest perception ratings; diversity and computer technology and database research skills received the lowest ratings. Students with research experience felt more prepared for a job, but those with a specialization felt the opposite. Females perceived themselves to be more competent than males in teamwork; students from rural farming backgrounds reported having lower critical thinking, problem-solving and verbal communication skills. Overall, the contribution of undergraduate education to career preparedness learning outcomes was positive.

## Introduction

Undergraduate education plays a pivotal role in shaping students' worldviews, their behaviors and their career paths. Students' experiences as undergraduates help them deal intelligently with the world and with societal problems. Today's fast-paced, highly competitive, knowledge-based global economy puts pressure on students to master subject matter knowledge and competencies. Once graduated, some students self-employ and use their expertise for their own businesses; others seek employment elsewhere. In either case, they need skills, knowledge, attitudes and behaviors with which they can pursue their work and their careers. Employers and other stakeholders are increasingly looking for graduates with proficiencies such as adaptability, communication skills and the ability to solve complex problems (Fischer, 2014). Therefore, it is important to understand whether undergraduates are ready for careers after

graduation and have the qualities that employers are looking for. This study sought to determine graduating seniors' perceptions of the career preparedness learning outcomes they achieved in the College of Agriculture and Natural Resources (CANR) at Michigan State University (MSU).

Undergraduate education is central to students' overall development; thus, it is essential that colleges offer good education to their undergraduates. Brooks et al. (2014) assert that colleges need to tailor their programs to address students' needs for learning outcomes. On a similar note, Wagenaar (2014) argued that learning outcomes are the manifestations of what learners are expected to know, understand and do after graduation. Wilson et al. (2004) advised educational institutions to assess their academic programs regularly and to be cognizant of whether the required courses adequately prepare students for their careers. Andelt et al. (1997) suggested assessing students' and employers' perceptions about skills preparation every three to five years.

Scholars have highlighted the merits of receiving student feedback, especially from seniors (Corts et al., 2000). As firsthand consumers, students are directly influenced by college programs and services and so students are in the best position to assess these experiences. Seniors who are about to graduate have gone through all the phases of undergraduate education and their experiences are current — therefore, their feedback is preferred over those of alumni and other, newer students (freshmen, sophomores, juniors) for assessing the overall college experience.

What are the qualities and/or abilities that seniors must have when they graduate? Ten abilities (called "learning outcomes" hereafter) reported by the National Association of Colleges and Employers Job Outlook 2013 (NACE, 2013) that employers want to see in new hires are: to communicate verbally with persons inside and outside the organization; to work in a team structure; to make decisions and solve problems; to plan, organize and prioritize work; to obtain and process information; to

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analyze quantitative data; to have technical knowledge related to the job; to have proficiency with computer software programs; to create and/or edit written reports; and to influence others. On a similar note, the Boyer Commission (1998) stressed that undergraduate education in research universities (e.g., Michigan State University) should aim to produce individuals with zeal for inquiring and problem solving, with skills in communication and with rich and diverse experiences so that they are able to provide scientific, technological, academic, political and creative leadership for the next century. The Association of American Colleges and Universities (2010) recommended sixteen learning outcomes, which it calls “value rubrics,” that students need to possess upon graduation. The new learning outcomes recommended by AACU that were not included in NACE (2013) and the Boyer Commission (1998) are: reading, civic engagement — local and global, intercultural knowledge and competence, ethical reasoning, foundations and skills for lifelong learning, global learning, integrative and applied learning.

This study is based on the student development theory of Chickering and Reisser (1993), which lists the abilities that students are supposed to attain from their education to remain knowledgeable, skillful, competitive and intellectual. These abilities are: developing competence (cognitive, psychological and technical); managing emotions; moving through autonomy toward interdependence; developing mature interpersonal relationships; establishing identity; developing purpose and setting clear career goals; and developing integrity. According to Phinney’s theory of racial and ethnic identity (2003), students of minority backgrounds struggle for their identity in college. Many college services do not suit them and efforts to help them benefit are not adequate. Although these students adapt to majority cultures, complete adaptation might not be possible, resulting in a direct impact on learning.

Most studies done to assess seniors’ perceptions of their undergraduate education in colleges of agriculture were based on cross-sectional data (Taub et al., 2006; Connors et al., 2006). Assessments of seniors’ perceptions of learning outcomes based on longitudinal data are lacking. This study sought to fill this knowledge gap. The findings of this study can help colleges of agriculture to focus on achieving desired learning outcomes among their undergraduates.

### Study Goals and Objectives

The overarching goal of this study was to assess student perceptions of their career preparedness learning outcomes and to suggest measures to improve the undergraduate program in the CANR at MSU. The specific objectives of this study were to identify any trends in students’ perceptions of their career preparedness learning outcomes over the past decade and to examine whether student perceptions of their career preparedness learning outcomes differ by their demographics — i.e.,

research experience, specialization, academic status, gender, residence, residency status and ethnicity.

## Methodology

This study employed an online survey of the graduating seniors in the CANR conducted from 2004 to 2013. After the initial survey instrument was designed, input from CANR undergraduate advisors and coordinators was sought to ensure face and content validity. This study was deemed exempt by MSU’s Institutional Review Board (IRB) on the Use of Human Subjects.

The survey instrument included questions about subjects’ academic information (primary major, specialization, dual major, second degree, participation in research) followed by ten statements on career preparedness learning outcomes: knowledge applicable to student’s anticipated career path; skills required for students’ anticipated career paths; critical thinking and problem-solving skills; written communication skills; verbal communication skills; teamwork skills; research skills; computer technology and database research skills; ability to work with diverse audiences; and leadership and interpersonal skills. Respondents were asked to indicate the degree to which their academic major contributed to the development of those learning outcomes on a five-point scale from “made no contribution” (1) to “contributed a great deal” (5). Other questions included subjects’ demographic information (gender, age, residency, residency status and ethnicity).

Graduating seniors received an email alerting them to the availability of the online survey during fall and spring semesters when senior students applied for graduation. Participants who completed the survey were provided with a free two-scoop ice cream coupon to use in a university dairy store.

Descriptive statistics (frequency, mean and standard deviation) were calculated for each academic year to look at the trends. An average score was calculated for each learning outcome. Independent sample t-tests were calculated to study the differences in perception ratings using the average scores by gender and differences in perceptions between students who participated in research and earned specializations and/or minors and those who did not. F values using one-way analysis of variance (ANOVA) were calculated to examine the differences in perceptions by academic year and subjects’ ethnicity, residency and residency types ( $p < 0.05$ ). For the variables with significant differences reported in one-way ANOVA tests, post-hoc tests were conducted to identify which categories differ from one another. The Statistical Package for Social Sciences was used to analyze the data.

## Results and Discussion

Seniors participating in the survey totaled 2,556. The academic year (AY) 2010-2011 had the highest number of respondents ( $n = 370$ ); 2003-2004 (when

the survey was initiated and included only spring semester data) had the fewest respondents (n=144). The majority of respondents (n = 1,936) were 23 years old; 98% of respondents were in the age range of 20 to 31. Females (60.6%) outnumbered male respondents. The majority of respondents identified themselves as Caucasian American (87.3%). African American, Asian American, Hispanic, Native American and “other” students accounted for 4%, 2.9 %, 1.9%, 0.6% and 3.4%, respectively. Students from suburban areas were more prevalent (48.5%) than students from rural areas who did not live on farms (25%), students from rural regions who did live on farms (15.2%) or students from urban regions (11.3%). Michigan residents dominated the respondents (90.3%). Out-of-state and international students represented 7% and 2.7% of the respondents, respectively. The Cronbach’s alpha coefficient calculated post hoc for the reliability of the survey instrument pertaining to items for career preparedness learning outcomes was 0.91.

**Trend of Learning Outcome Perceptions**

Student perceptions of all career preparedness learning outcomes showed a gradual improvement over the study period (Table 1). Knowledge applicable to anticipated career paths dominated the skill list throughout the study. Participants indicated that they felt positive about their teamwork skills, skills required for a career and critical thinking and problem-solving skills, which indicates that the CANR undergraduate programs were focusing not only on the theoretical aspects of learning but also on the skills required for their practical

application. The lowest ratings — of diversity, computer technology and database research and research skills — are, however, worrying.

After a slow but positive start from 2004 to 2006, student perceptions of learning outcomes declined during the 2007-2009 and 2010-2011 periods. Whether an internal management and/or an academic decision within the CANR or an external (state or federal) economic and/or educational policy affected undergraduate advising and thus student perceptions needs further inquiry. The ratings of perceived learning outcomes improved again from 2012 on.

Findings in Table 1 show that academic majors contributed considerably to acquiring knowledge applicable to students’ anticipated career paths (4.03 ± 0.89), teamwork skills (3.92 ± 0.97), skills needed for students’ career paths (3.89 ± 0.93) and critical thinking and problem-solving skills (3.89 ± 0.90). Given that teamwork is the second most important skill that employers look for in their employees (NACE, 2013; NACE, 2015), it is encouraging that undergraduates in the CANR give the second highest mean rating for teamwork skills and that there has been gradual improvement in its rating over the past decade. This indicates that the CANR is committed to developing teamwork skills among its undergraduates. It should be noted that, though this rating is higher than the rating by CANR graduates from 1993 to 1998, as found by Suvedi and Heyboer (2004), it is lower than the ratings of perceived preparedness for teamwork by the seniors in colleges in the southeastern United States (DuPre and Williams, 2011). Importantly, ratings of teamwork

**Table 1. Perceptions of Learning Outcomes from 2004 to 2013**

Career preparedness learning outcomes	Academic Year (n)										Ten years' average (n=2,477)
	2003-04 (144)	2004 - 05 (167)	2005 - 06 (179)	2006 - 07 (169)	2007 - 08 (328)	2008 - 09 (291)	2009 - 10 (239)	2010 - 11 (370)	2011 - 12 (306)	2012 - 13 (274)	
	M(SD)										
Knowledge applicable to your anticipated career path	3.95 (1.03)	4.02 (0.93)	4.02 (0.91)	4.02 (0.98)	4.03 (0.83)	4.02 (0.90)	4.03 (0.88)	4.00 (0.91)	4.07 (0.82)	4.10 (0.87)	4.03 (0.89)
Skills required for your anticipated career	3.84 (1.02)	3.87 (0.98)	3.93 (0.91)	3.95 (0.93)	3.89 (0.91)	3.84 (0.94)	3.86 (0.95)	3.86 (0.95)	3.91 (0.89)	3.96 (0.91)	3.89 (0.93)
Critical thinking and problem-solving skills	3.79 (1.08)	3.93 (0.94)	3.96 (0.86)	3.91 (0.88)	3.84 (0.89)	3.81 (0.94)	3.92 (0.85)	3.88 (0.90)	3.94 (0.84)	3.92 (0.90)	3.89 (0.90)
Written communication skills (e.g., papers, reports, news articles)	3.71 (1.05)	3.88 (1.10)	3.82 (0.99)	3.81 (0.96)	3.66 (0.97)	3.62 (0.98)	3.85 (0.93)	3.64 (1.03)	3.76 (0.87)	3.77 (0.91)	3.74 (0.98)
Verbal communication skills (e.g., class presentations, group discussions)	3.78 (1.02)	3.87 (1.06)	3.91 (0.98)	3.88 (0.99)	3.78 (0.93)	3.78 (0.99)	3.98 (0.87)	3.81 (0.97)	3.94 (0.90)	3.92 (0.93)	3.86 (0.96)
Teamwork skills	3.76 (1.10)	3.96 (1.06)	3.96 (1.04)	4.02 (0.97)	3.94 (0.92)	3.90 (0.97)	4.01 (0.90)	3.88 (0.97)	3.91 (0.95)	3.93 (0.91)	3.92 (0.97)
Research skills	3.40 (1.17)	3.66 (1.16)	3.72 (1.02)	3.79 (1.08)	3.71 (1.02)	3.60 (1.07)	3.73 (0.99)	3.50 (1.08)	3.65 (1.04)	3.65 (1.01)	3.64 (1.06)
Computer technology and database research skills	3.48 (1.15)	3.50 (1.22)	3.51 (1.11)	3.60 (1.02)	3.51 (1.04)	3.50 (1.02)	3.66 (0.93)	3.47 (1.02)	3.57 (1.05)	3.50 (1.01)	3.53 (1.05)
Diversity (e.g., working with others from diverse backgrounds)	3.28 (1.24)	3.36 (1.26)	3.11 (1.16)	3.30 (1.20)	3.32 (1.12)	3.38 (1.09)	3.44 (1.13)	3.35 (1.13)	3.39 (1.14)	3.53 (1.10)	3.36 (1.15)
Leadership and interpersonal skills (e.g., club management, understanding others, conflict management)	3.60 (1.13)	3.87 (1.08)	3.63 (1.11)	3.67 (1.00)	3.62 (1.01)	3.63 (1.00)	3.73 (1.01)	3.65 (1.10)	3.76 (1.31)	3.77 (1.07)	3.69 (1.05)

Scale: 1 =made no contribution, 2 =made some contribution, 3 =made a moderate contribution, 4 =made a considerable contribution and 5 =contributed a great deal.

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and problem-solving skills in this study are higher than the ratings given by employers of graduates of the U.S. landgrant university as reported by Alston et al. (2009).

Students and academia alike have to tackle agricultural and natural resources issues stemming from human (sociopolitical, ethical) and economic activities. Reasoned and purposive problem-solving skills are required (Quinn et al., 2009). In addition, critical thinking and problem-solving skills are considered important employability attributes in new job applicants for employers making hiring decisions (NACE, 2013). CANR graduates have consistently indicated that their education contributed considerably to attaining these skills (Table 1). Communication skills (e.g., writing, verbal, interpersonal) are essential for students, both during college and beyond (Shrestha, 2009). Findings in Table 1 indicate that education in the CANR helped considerably in honing students' verbal and written communication skills. The ratings of communication skills by CANR seniors are consistent with the ratings by undergraduates in the southeastern United States (DuPre and Williams, 2011).

Increased diversity within societies is creating new challenges and opportunities for employers and employees. Employers value employees who can work with multicultural and multilingual consumers. According to Cabrera et al. (2002), collaborative and cooperative learning breaks down stereotypes among students because students learn to work together, develop interpersonal skills and learn about people from other backgrounds. Having students in large numbers in colleges will be worthwhile only when students from diverse backgrounds are able to interact with one another (Gurin et al., 2004). Therefore, with diversity rated the lowest overall ( $3.36 \pm 1.15$ ), there is reason for concern about how the college is addressing this outcome (Table 1).

Computer competence is an indispensable part of students' lives. Ratings of perceptions of computer skills in the CANR ( $3.53 \pm 1.05$ ) were moderate but better than those found by Johnson et al. (2001). Uses of computers and computer technologies are many. Computers and computer software are essential in data storing, data analysis and program modeling. Given that computer skills received the second lowest rating, the recommendations by Suvedi and Heyboer (2004) that colleges should better prepare their graduates for software and computer use still seem relevant. Computer-related needs of students of 2004 (when this survey started) might have been different from what students need today. Despite the fact that colleges at MSU, including the CANR, have advanced greatly in the use of computer technologies in recent years and students are learning more online and out of class than they are in classes, the findings indicate that seniors' wants and needs for computer use in the CANR are not fully met. The CANR may want to ask students what specific needs they have so that these needs can be addressed.

Use of research as a tool to educate undergraduates and consideration of research experience as a cri-

terion for hiring employees are both gaining ground. Undergraduate students who engaged in research activities with faculty members had a higher probability of pursuing graduate education, conducting research in the future (Russell et al., 2007; Shrestha, 2009) and finding jobs more quickly (Kinkel and Henke, 2006). Research universities such as MSU need to foster a research culture and teach the associated skills among their students (Boyer Commission, 1998). The low perception ratings by seniors ( $3.64 \pm 1.06$ ) suggest that the CANR has to work harder to engage its undergraduates in research.

## Perceptions of Learning Outcomes by Research Experience and Specialization and/or a Minor

To address the second objective of this study, we calculated independent sample t-tests and one-way analysis of variance between respondents' sociodemographic traits and learning outcome average scores. Respondents who participated in research activities felt that they acquired better learning skills than did those without research experience (Table 2). Students who participated in research indicated that their education contributed to their acquisition of knowledge applicable to their anticipated career paths ( $p < 0.01$ ), the skills required for those anticipated career paths ( $p < 0.01$ ), critical thinking and problem-solving skills ( $p < 0.01$ ), written communication skills ( $p = 0.03$ ) and research skills ( $p < 0.01$ ) more than those who did not participate in research (Table 2). Our findings are consistent with those of Hamilton et al. (2013), who reported that undergraduates with research exposure gained better analytical and critical thinking skills, written communication abilities and self-confidence. Besides gaining firsthand research experience, research students get opportunities to delve in-depth into problems and work to find solutions using appropriate research methods, thus enhancing their reasoning and analyzing power. Students doing research engage in writing both research proposals and research reports. This could explain why seniors with research experience reported having higher writing skills.

To our surprise, students with a specialization and/or a minor rated all learning outcome skills lower than did students with no specialization and/or a minor (Table 2). Students pursuing a specialization or minor rated skills required for an anticipated career path ( $p < 0.05$ ), verbal communication ( $p < 0.01$ ), teamwork skills ( $p < 0.01$ ), computer use ( $p < 0.01$ ) and diversity ( $p < 0.05$ ) lower than those not pursuing a specialization and/or a minor (Table 2). Cole and Thompson (2002) reported that technical competencies and specialization in their respective fields of study are among the most important criteria used by employers when hiring for entry-level positions. The results indicated that respondents' specializations and/or minors were not perceived as assisting in honing their skills. The findings raise questions about the format and options for specializations.

**Table 2. Perceptions of Learning Outcomes by Gender, Participation in Research, and Specialization and/or Minor**

Career preparedness learning outcomes	Participation in undergraduate research: Yes (n=515); No (n=878)				Pursued specialization/minor: Yes (n=562); No (n=836)				Gender: Male (n=966); Female (n=1,496)			
	Yes/No	M	t-value	p-value	Yes/No	M	t-value	p-value	Gender	M	t-value	p-value
Knowledge applicable to your anticipated career path	Yes	4.16	3.848	0.000	Yes	4.02	0.722	0.470	Male	4.05	0.593	0.553
	No	3.98			No	4.06			Female	4.03		
Skills required for your anticipated career	Yes	3.99	3.064	0.002	Yes	3.82	2.530	0.012	Male	3.89	0.046	0.963
	No	3.84			No	3.94			Female	3.90		
Critical thinking and problem- solving skills	Yes	4.02	4.099	0.000	Yes	3.85	1.545	0.122	Male	3.91	0.509	0.611
	No	3.82			No	3.93			Female	3.89		
Written communication skills (e.g., papers, reports, news articles)	Yes	3.80	2.193	0.028	Yes	3.71	0.592	0.554	Male	3.72	0.711	0.477
	No	3.68			No	3.74			Female	3.75		
Verbal communication skills (e.g., class presentations, group discussions)	Yes	3.94	1.518	0.129	Yes	3.79	3.210	0.001	Male	3.83	1.349	0.177
	No	3.86			No	3.95			Female	3.88		
Teamwork skills	Yes	3.91	0.317	0.752	Yes	3.79	4.185	0.000	Male	3.88	2.238	0.025
	No	3.92			No	4.00			Female	3.97		
Research skills	Yes	3.92	8.781	0.000	Yes	3.60	0.568	0.570	Male	3.62	0.651	0.515
	No	3.44			No	3.63			Female	3.65		
Computer technology and database research skills	Yes	3.58	1.544	0.123	Yes	3.41	3.553	0.000	Male	3.51	0.771	0.441
	No	3.50			No	3.61			Female	3.54		
Diversity (e.g., working with others from diverse backgrounds)	Yes	3.38	1.000	0.317	Yes	3.33	2.305	0.021	Male	3.37	0.319	0.750
	No	3.44			No	3.47			Female	3.36		
Leadership and interpersonal skills (e.g., club management, understanding others, conflict management)	Yes	3.77	1.757	0.079	Yes	3.66	1.531	0.126	Male	3.66	1.170	0.242
	No	3.67			No	3.75			Female	3.72		

Scale: 1= made no contribution, 2= made some contribution, 3= made a moderate contribution, 4= made a considerable contribution, 5= contributed a great deal.

Is it because specializations are elective courses that students take to transition to graduate programs? Is it because students doing a specialization and/or a minor are very focused in their work and communication with others may be a lesser priority? Do they hold ambitious targets, including acquiring computer skills? Additional studies are needed to answer these questions.

**Perceptions of Learning Outcomes by Respondents’ Gender, Residence, Residency Type and Ethnicity**

In teamwork skills only, females’ ratings were higher ( $p < 0.05$ ) than males’ ratings (Table 2). Females share their views more with others than males do; females are generally more frequent users of mediated communication; and compared with men, women more frequently use social media to communicate (Kimbrough et al., 2013). Better communication could have helped females to form groups and work together.

Rural students who lived on farms tended to rate their career preparedness skills lower than the other three groups. Rural students who did not live on farms (4.07) and suburban students (4.07) rated knowledge applicable to their anticipated career paths higher than did rural students who lived on farms (3.90) and students who came from urban communities (3.98) (Table 3). The post-hoc tukey-b result showed that ratings of students who lived on farms were significantly lower than ratings of rural students who did not live on farms and those who came from suburban regions ( $p < 0.05$ ).

Similarly, rural students who did not live on farms (3.96) and those who came from suburban communities (3.93) rated skills required for their anticipated career paths higher than rural students who lived on farms (3.69) (Table 3). The post-hoc tukey-b tests confirmed that the ratings were significantly different ( $p < 0.01$ ). Students with a suburban background perceived themselves to be better in critical thinking and problem solving and verbal communication than students from other backgrounds (Table 3). The post-hoc tukey-b tests did not show any differences between the groups for critical thinking and problem solving, however, though post-hoc tests showed differences between suburban and rural students who lived on farms on ratings of verbal communication. Students differed in computer skills, teamwork and diversity skills, with higher ratings from urban students (Table 3). The post-hoc tukey-b tests showed that ratings of rural students who lived on farms were lower in teamwork than those of the other three groups; ratings of rural students who lived on farms were lower in computer technology than those of urban students; and urban students’ ratings in diversity were higher than those of the other three groups. Having had exposure to farming, students who came from rural regions and who grew up on farms might be expected to find undergraduate education in the CANR interesting and achieve higher skills, but the results showed the opposite. The recent trends show that rural youths are hesitant to pursue farming and those who attend colleges do not find agricultural education as beneficial as other

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**Table 3. Perceptions of Learning Outcomes by Residency, Residence Status and Ethnicity**

Career preparedness skills	Rural on rural farm (n=298), rural but not a farm (n=497), suburban (n=958), urban (n=223)				In-state (n=1,789), out-of-state (n=139), international (n=50)				White (n=2,030), Hispanic (n=44), African American (n=88), Asian American (n=66), Native American (n=13)			
		M	F value	p value		M	F value	p value		M	F value	p value
Knowledge applicable to your anticipated career path	Rural area, on a farm	3.90	3.409	0.017	In-state	4.05	9.523	0.000	White	4.05	0.929	0.426
	Rural but not on a farm	4.07			Out-of-state	4.04			Hispanic	3.89		
	Suburban	4.07			International	3.51			African American	4.10		
	Urban	3.98			Asian American	3.94						
Skills required for your anticipated career	Rural area on a farm	3.69	6.963	0.000	In-state	3.90	8.321	0.000	White	3.91	1.192	0.311
	Rural but not on a farm	3.96			Out-of-state	3.92			Hispanic	3.71		
	Suburban	3.93			International	3.37			African American	4.01		
	Urban	3.82			Asian American	3.84						
Critical thinking and problem-solving skills	Rural area on a farm	3.76	2.849	0.036	In-state	3.90	5.41	0.005	White	3.90	0.602	0.614
	Rural but not on a farm	3.90			Out-of-state	3.89			Hispanic	3.84		
	Suburban	3.93			International	3.48			African American	3.99		
	Urban	3.85			Asian American	4.00						
Written communication skills (e.g., papers, reports, news articles)	Rural area on a farm	3.65	0.635	0.593	In-state	3.72	1.315	0.269	White	3.73	1.465	0.222
	Rural but not on a farm	3.72			Out-of-state	3.75			Hispanic	3.78		
	Suburban	3.73			International	3.51			African American	3.95		
	Urban	3.73			Asian American	3.78						
Verbal communication skills (e.g., class presentations group discussions)	Rural area on a farm	3.72	2.972	0.031	In-state	3.88	2.608	0.074	White	3.86	1.326	0.264
	Rural but not on a farm	3.86			Out-of-state	3.76			Hispanic	3.84		
	Suburban	3.90			International	3.63			African American	4.07		
	Urban	3.87			Asian American	3.88						
Teamwork skills	Rural area on a farm	3.73	5.754	0.001	In-state	3.94	1.036	0.355	White	3.93	1.342	0.259
	Rural but not on a farm	3.93			Out-of-state	3.89			Hispanic	4.04		
	Suburban	3.98			International	3.76			African American	4.12		
	Urban	4.00			Asian American	3.92						
Research skills	Rural area on a farm	3.55	2.216	0.084	In-state	3.65	0.202	0.817	White	3.64	2.284	0.077
	Rural but not on a farm	3.64			Out-of-state	3.70			Hispanic	3.69		
	Suburban	3.65			International	3.61			African American	3.92		
	Urban	3.79			Asian American	3.75						
Computer technology and database research skills	Rural area on a farm	3.40	2.541	0.055	In-state	3.54	0.39	0.677	White	3.52	1.996	0.113
	Rural but not on a farm	3.56			Out-of-state	3.53			Hispanic	3.60		
	Suburban	3.54			International	3.41			African American	3.74		
	Urban	3.64			Asian American	3.70						
Diversity (e.g., working with others from diverse backgrounds)	Rural area on a farm	3.34	3.417	0.017	In-state	3.40	0.491	0.612	White	3.34	4.431	0.004
	Rural but not on a farm	3.34			Out-of-state	3.30			Hispanic	3.71		
	Suburban	3.38			International	3.40			African American	3.64		
	Urban	3.61			Asian American	3.60						
Leadership and interpersonal skills (e.g., club management, understanding others, conflict management)	Rural area on a farm	3.70	0.131	0.942	In-state	3.70	2.105	0.122	White	3.70	1.605	0.186
	Rural but not on a farm	3.68			Out-of-state	3.64			Hispanic	3.77		
	Suburban	3.68			International	3.42			African American	3.92		
	Urban	3.72			Asian American	3.62						

Scale: 1= made no contribution, 2= made some contribution, 3= made a moderate contribution, 4= made a considerable contribution, 5= contributed a great deal.

students do. These two issues seem to be related. The low ratings on teamwork, verbal communication and diversity skills by rural students who grew up on farms might have been due to insufficient opportunities to mingle with youths from urban and diverse communities. The CANR needs to be responsive in addressing issues that students from rural regions face so that more youth from rural areas will join undergraduate programs in the future.

American (in-state and out-of-state) students believed that they attained higher career preparedness skills from their undergraduate education than international students. Student perceptions of their knowledge applicable to anticipated career paths, skills required for anticipated career paths and critical thinking and problem-solving skills differ by their residency types (in-state, out-of-state and international), with  $p < 0.01$ ,  $p < 0.01$  and  $p < 0.01$ , respectively (Table 3). The post-hoc tests showed international students' ratings of all three of these variables to be significantly lower than those of the other two groups. U.S. universities are in a campaign to internationalize college education, to enhance diversity

in their institutions and to attract international students (Brooks et al., 2006). The findings show, however, that international students are not benefiting in the same way as domestic students. International students gave lower ratings on honing their knowledge, skills and critical thinking and problem-solving skills required for their postcollege careers. Most international students come from entirely different academic systems and cultural environments and they find it challenging to accustom to the new academic and cultural atmosphere in the United States. Studies indicating that proficiency in English, social communication with compatriots (Li et al., 2010) and teaching strategies are affecting international students' learning may apply to CANR students as well. Cultural and other challenges that international students have to face could also be a factor and perhaps pedagogical methods are not suiting international students' past experiences. However, the findings of this study contradict the findings of Zhao et al. (2005) that international students engage themselves in more educational activities than their American counterparts and by the time of graduation they are more like

American students in their engagement patterns. These conflicting findings indicate the necessity to examine further the factors that are limiting international students from learning and initiate efforts to address them.

For analyzing the perceptions of students by their ethnicities, one-way ANOVA was conducted. Findings show that students of four ethnicities—white American, Asian American, African American and Hispanic (Native Americans were excluded from analysis because of their minimal responses)—differ in their perception ratings of diversity ( $p < 0.01$ ), with the highest ratings from Hispanic students and the lowest ratings from white students.

### Conclusions and Recommendations

Increasing globalization, advancement in science and technology, a surge in unemployment and layoff rates and quickly changing job markets demand that today's graduates be more efficient and skillful than their predecessors. The task of offering students the courses that they need and helping them succeed and sustain their postcollege career trajectories seems daunting but achievable. In this context, undergraduate education in the CANR seems to be contributing considerably to students gaining the skills they require for careers. Students' perceptions of learning outcomes in the CANR have been improving. Academic majors have contributed considerably to acquiring knowledge, teamwork skills, skills needed for students' anticipated career paths and critical thinking and problem-solving skills. Academic majors have contributed the least, or only moderately, to developing diversity skills and computer technology and database research skills. Respondents from various ethnic groups differed in their perceptions of a few of the career preparedness skills, but respondents differed on many of the career preparedness learning outcomes by their residence, residency status, experience in research and specialization and/or minor. Students indicated that their research experience helped them gain higher career preparedness skills but that a specialization did not. Rural students perceived themselves to have lower career preparedness skills than others did.

On the basis of the above discussion, we would like to offer the following suggestions. First, given that white students had lower ratings on diversity than Hispanic and African American students and that diversity is one of the important skills that employers would like to see in new hires, the CANR should work further to nurture diversity among students. Colleges should promote diversity in its undergraduate program by organizing orientations and fairs; designing and distributing diversity-related educational materials; encouraging students and faculty members from diverse backgrounds to participate in diversity fairs and orientations; providing opportunities for students from different states and nations to get acquainted and providing them exposure to multicultural communities; and including more sessions on diversity in the curricula. Second, students should have access to adequately equipped computer labs with the latest software. Colleges should provide computer training to

students if needed. Third, students coming from rural areas may need additional advising. Colleges should encourage these students to take part in extracurricular activities and join student clubs. These students may also need practical and interactive sessions on verbal communication to hone their communication skills. Instructors have to customize their teaching methods to suit these students. Fourth, students should be given ample opportunities to engage in research and colleges should allocate more resources for undergraduate research. If needed, colleges should provide orientation to faculty members to address students' research needs. Fifth, we advise colleges to evaluate their specialization and/or minor programs and examine how specialization is contributing to students and colleges attaining their goals. These programs should be redesigned as needed. Sixth, colleges should try to tailor education programs to suit international students' needs. International students may have academic, sociocultural and other barriers to learning and education that colleges need to address. Therefore, the CANR should provide orientation to its faculty and staff members to address varied educational needs of international students. Encouraging teamwork with American students in assignments and class discussions might help to overcome the language and cultural barriers facing international students.

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