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Identifying Competencies Possessed and the Skills Needed of Entry-Level College Graduate Agribusiness Employees*

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Identifying Gaps in the Competencies Possessed and the Skills Needed of Entry-Level College Graduate Agribusiness Employees

A major goal of Colleges of Agriculture is to prepare students for productive careers in agribusiness. Goecker, Gilmore, and Whatley estimated that approximately 40% of the potential job openings for food and agricultural sciences graduates during 2000-2005 would be for positions in management, finance, and marketing, and Goecker et al. (2005a) projected that 46% of job openings for agricultural graduates from 2005-2010 will be in management and business occupations. Goecker et al. (2005a) also estimated that the number of agricultural graduates qualified for these management/business positions would represent only 60% of the job openings, and that agribusiness firms would turn to graduates of allied fields, such as business curricula, to fill the remaining 40% of the job openings. There is no previous research to indicate whether agricultural graduates are at an advantage or disadvantage relative to business graduates in meeting the needs of agribusiness employers. Research evaluating the relative performance of agricultural and business college graduates would be valuable in assisting educators in determining the relevant curricula and course content to improve the competencies of agricultural and business graduates as agribusiness employees.

The objective of this research is to determine what weaknesses and strengths agribusiness managers observe in their recent agricultural <u>and</u> business college-graduate employees. That is, we seek to identify "gaps" between the knowledge, skill, ability, and trait areas (KSATs) of entry-level college graduate employees and the KSATs required for successful careers in agribusiness. We do so by conducting a nationwide survey of agribusiness firms.

The paper proceeds as follows. First, we provide background information on previous studies that have investigated the KSATs that employers desire in their college graduate employ-

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ees and/or employer perceptions of the strengths/weaknesses of their college graduate employees. Next, we discuss our survey procedures. We then present our survey results and discuss their implications for curricula and course content.

Background

Table 1 summarizes surveys of agribusiness and general business employers in which the respondents were asked to assess the KSATs of baccalaureate graduates of either agricultural or business programs and/or to assess the employee KSATs required for successful business careers. Note that none of these surveys have compared agricultural graduates to business graduates in terms of their KSATs.

Broder and Houston surveyed agribusiness firms in order to assess the needs and perceptions of firms that employ agricultural graduates. Their survey distinguished between graduates with degrees in six agricultural areas (i.e., agricultural economics/agribusiness, animal sciences, plant and soil sciences, agricultural engineering, agricultural social sciences, general agriculture) and in non-agricultural areas. On average, the employers ranked communication skills as being the most important KSAT that they sought in graduates across all degree types, and ranked leadership experience as being the second most important trait for six of the seven degree types. When the respondents were asked what KSATs they found to be most lacking among their graduate hires, they most frequently cited communication skills across all degree types. In discussing their findings, Broder and Houston (p. 21) stated that Colleges of Agriculture should evaluate "the level of communication skills requirements … (and) provide greater opportunity for leadership and internship experience in their degree programs."

In a national survey, Litzenberg and Schneider asked agribusiness managers to rank the importance of 74 KSATs sought in new employees. The average ranking of the major KSAT

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categories from most to least important were: interpersonal characteristics (e.g., work with others, self-motivation, leadership, etc.); communication skills (e.g., listening, writing, speaking, etc.); business and economics skills (e.g., finance, marketing, accounting, economics, etc.); technical skills (e.g., crop production, livestock production, biosciences, etc.); computer, quantitative, and management information (e.g., software, accounting systems, math, statistics, etc.); and previous work experience (e.g., work experience, extracurricular activities, internships, general education, etc.). Based on their survey results, Litzenberg and Schneider (p. 1032) concluded that "educators must address the development and improvement of … interpersonal and communication skills" of their students.

In a survey of agribusiness firms in Southern California, Klein asked the respondents to rank the importance of 40 KSATs of entry-level college graduate hires. The five most important KSATs in terms of average rankings were the ability to: be a team player in problem solving situations; express ideas clearly both verbally and in writing; work without supervision; maximize and coordinate the use of human and physical resources; and use selling techniques. Klein (p. 34) stated "if these findings … are correct, they may raise questions about the appropriateness of our educational methods. If, for example, we stress the acquisition of knowledge at the expense of teaching students how to think and react in a problem solving context, we may not be preparing students for successful employment in the contemporary business environment."

Andelt, Barrtee, and Bosshamer asked the employers of graduates of the College of Agricultural Sciences and Natural Resources (CASNR), University of Nebraska - Lincoln to evaluate the skill preparation of CASNR graduates and the importance of 51 KSATs in four major categories. The four major KSAT categories had the same rankings for both entry-level abilities and current importance, and were (from highest to lowest): personal qualities; communication skills;

leadership skills; and computer, quantitative, and management information skills. The authors (p.48) concluded that "(t)ypically we faculty consider own subject matter domains to be the most important subject our students learn. What this study helps faculty understand is that employers do not discount the importance of technical subject matter, they do indicate that skills in communication, leadership, interpersonal competence, and computers are needed to survive in today's agribusiness environment."

In a survey of domestic agribusiness members of the International Agribusiness Management Association, Wachenheim and Lesch asked the respondents to rank the importance of 11 KSATSs of entry-level employee applicants. In order, the top five KSATs were people skills, communication skills, teamwork skills, leadership experience, and quantitative skills.

Two other studies have focused on perceived strengths/weaknesses in agricultural graduates. As part of a survey of agribusiness employers in Oregon, Cole and Thompson asked the respondents how the College of Agricultural Sciences (CAS) at Oregon State University could improve its graduates for agribusiness positions. The three most common responses were: writing skills improvement, making sure that the graduates have practical (hands-on) experience, and requiring internships. Suvedi and Heyboer surveyed graduates of Michigan State University's College of Agriculture and Natural Resources (CANR) and their employers to assess the preparation of the graduates in nine KSAT areas. On average, the employers rated the employees as being least prepared in terms of their computer, math, and writing skills.

Table 1 also summarizes the findings of nine surveys of employers of Business College graduates. The last column in Table 1 gives the top KSATs identified by the respondents. Eight of these surveys identified interpersonal skills such as communication, leadership, and social interaction in the top three skills needed by new college hires. The remaining survey (i.e., Collier

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and Wilson) found that technical skills in finance and accounting were the most important, followed by ethics.

These prior surveys suggest the importance of interpersonal skills (e.g., leadership, team skills, etc.) and personality traits (e.g., enthusiasm, self-confidence, etc.) for both Agricultural and Business College graduates. It is interesting that the interpersonal and personality KSATs are usually rated as being more important employee KSATs than are "subject matter" skills for employers of both Agricultural and Business College graduates. And, while these KSATs are rated as being among the most important KSATs, employers often indicate that graduates are weakest in these areas.

All personality traits belong to one factor in the Five-Factor model of personality (Judge et al.). The Five-Factor model consists of (1) Extraversion (a measure of sociability), (2) Neuroticism (tendency to anxiety, personal insecurity and depression, so that self-confidence is low neuroticism), (3) Conscientiousness (achievement orientation, dependability, and orderliness), (4) Openness to Experience (imaginative and non-conforming), and (5) Agreeableness (cooperative, likeable, and gentle).[1] There has been extensive testing of the validity of this Five-Factor model in multiple cultures. All studies to date have suggested that three of these personality traits – Neuroticism, Extraversion, and Conscientiousness – are related to career success (Judge et al). For example, Conscientiousness is a strong predictor of job proficiency and performance (Fornham et al.). Moy and Lam found that when hiring new college graduates, personnel managers saw Conscientiousness as the most important personality trait and even more important than skills and abilities. These personality traits are stable over time and may be related to genetic differences. Oniszczenko et al. found that half of the variance in personality traits could be attributed to genetic differences and half to the environment. Robins et al. found that college

does not alter the basic personality traits of its students; although students who achieved high grades demonstrated increases in Conscientiousness, which is related to a sense of responsibility and hard work, and Ridgell and Lounsbury found that work drive is related to academic performance. Based on this previous research, there is no a priori reason to suspect differences in personality traits between agricultural and business graduates.

Survey Procedures

Based on the previous studies discussed above, we identified 22 KSATs (leadership, public speaking, listening, relating to different kinds of people, basic business practice understanding, problem solving, decision-making, risk management, negotiation, computer technology, understanding of international cultures, business ethics, personal ethics, understanding of a market-based economy, globalization, interdependence of business functions, teamwork, conflict resolution, enthusiasm, self-confidence, initiative, and professionalism) that managers have identified as being important for successful business careers. We designed a mail survey instrument that asked agribusiness managers to use a five-point scale (5 = very strong, …, 1 = very weak) in assessing the competencies of their recent college hires (i.e., employees hired out of college within the last five years) in these KSAT areas according to whether the hires had agricultural or business degrees. Because of the wide array of firms included in our survey (see below), we focused on generic KSATS rather than more specific KSATs that would be important for particular firms. The survey instrument was designed so that the survey instructions and questions would fit on the front and back of a single 8½" by 11" sheet, and could be completed by the respondents in less than ten minutes. We pre-tested the instrument with six agribusiness managers and revised the instrument in light of their comments.

Our survey did not ask the respondents to distinguish between types of agricultural graduates. Thus, agricultural economics/agribusiness, agronomy, horticulture, animal sciences and other agricultural graduates were treated as a single group. Readers may question the validity of comparisons of business students and agricultural graduates in general because agricultural majors other than agricultural economics/agribusiness might not be expected to compete against business graduates. Our decision to "lump" agricultural economics/agribusiness majors together with other agricultural majors was based on several factors. Our experience has been that many agribusiness firms hire students from a variety of agricultural disciplines for business management/sales/marketing positions. Our methodology is consistent with other studies of employment opportunities for agricultural graduates. Goecker et al. (2005b) asked a panel of experts (POE) to project employment opportunities for agricultural graduates in four clusters: scientific and engineering occupations; management and business occupations; agricultural and forestry production operations occupations; and education, communication, and governmental services occupations. The POE based their projections in part on historic trends in hiring by agribusiness firms. Using Table 7 of Goecker et al. (2005b), we calculated that agricultural economics/agribusiness graduates constitute only 12.4% of the projected employment of agricultural graduates in the management and business occupations, and the remaining 87.6% of the projected employment of agricultural graduates in these occupations would come from other agricultural disciplines. Had we asked the respondents to confine their evaluations to the agricultural economics/agribusiness majors among their agricultural college hires, we would have run the risk of obtaining a relatively small number of evaluations of agricultural graduates. A survey that asked the respondents to evaluate agricultural graduates according to their majors would require a multi-page instrument and would require more than ten minutes for respondent to com-

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plete. Had we expanded the survey instrument, we would have run the risk of obtaining a relatively low response rate. Also, our survey did not ask the respondents to rank the relative importance of the 21 KSATs. To do so would have required expanding the survey instrument and the time to complete the survey.

Table 2 shows the industries that we classified as being in the agribusiness sector and their North American Industry Classification System (NAICS) codes. These 20 NAICS codes correspond to 97 four-digit Standard Industrial Classification (SIC) codes (Executive Office of the President). We used the Gale Group's electronic database, *General Business File ASAP*, as the sample frame to obtain an address list for our sample of firms operating in these 97 industries. This database contains sales, employment (for some companies), and other data at the company level (i.e., company-level data are not available at the four-digit SIC level unless the company operates in only one four-digit SIC industry). Companies that operate in multiple SIC industries are listed under each SIC industry in which they operate. We included in our sample the top ten firms in terms of sales in each of these 97 SIC codes.[2] If these firms operated in multiple four-digit industries, they were assigned to an individual four-digit industry so that the sample included at least ten companies from each four-digit industry. We then drew a random sample of 2,030 of the remaining firms, for a total sample of 3,000 firms. The database includes domestic and international firms. We included the international firms in the sample if they have U.S. operations.

Our mailings were addressed to the individuals listed as the human resource executive (or similar title) when provided. When the database did not provide the name of the human resource executive for a firm, the mailings were addressed to the individual listed as the president (or similar title). And when the database did not provide the name of any company official for a

firm, we addressed the mailings to the "Human Resource Director." The initial mailing consisted of a letter notifying the sample firms that they would be receiving a survey instrument within a few days. The second mailing consisted of a survey packet. The packet for the 970 "top ten" firms included a cover letter, four survey instruments, and four self-addressed stamped envelopes (SASEs). The cover letter asked the recipient to complete one of the questionnaires and to distribute the three remaining questionnaires to managers who supervised entry-level college graduate employees, preferably in finance, sales/marketing, and operations management. The packet for the remaining firms included a cover letter, a survey instrument, and a SASE. This cover letter asked the recipient or another manager who supervised entry-level college graduate employees to complete the questionnaire.[3] We tracked the survey responses by including an identification number on the labels of the return envelopes. A second survey packet was mailed to the firms that did not return their survey forms. Because of the low response rate for the multiple questionnaires mailed to the 970 "top-ten" firms, the follow-up mailing to those firms included one survey instrument and one SASE.

Results

Out of the 3,000 firms in the sample, 658 firms submitted usable responses and 228 firms could not be contacted by mail, so the response rate was 23.7%. Twelve of the firms that received four survey forms in their initial survey packets returned two or more completed survey forms, so the total number of individuals responding was 682. The response rate to our survey is above the average response rate of 21% for general business surveys (Dillman, p. 323) and the response rates for agribusiness surveys conducted by Broder and Houston (14%) and Wachenheim and Lesch (20%), but is below the response rates for Klein's (28%) and Cole and Thompson's (40%) agribusiness surveys. Litzenberg and Schneider did not provide an overall response

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rate for their agribusiness survey, but indicated the response rates ranged from 6% for food proc-essing/distribution firms to 13% for grain-processing firms.

Among the respondents, 250 reported that they had supervised new college-graduate hires within the last five years, and the average number of supervised graduate hires was 9.88. Of these respondents, 19 had supervised agricultural graduates (average number supervised = 4.29), 164 had supervised business graduates (average number supervised = 6.30), 49 had super-vised both agricultural and business graduates (average number supervised = 13.59), and 18 had supervised other types of graduates (average number supervised = 5.28). Table 3 shows the ar-eas supervised by the respondents. With the exception of production/operations management, the distributions of the areas supervised are similar across graduate types. On balance, the re-spondents appear to have evaluated their hires of business and agricultural graduates on the basis of their performance in similar functional areas.

Table 4 summarizes the assessments of respondents who had supervised both types of graduates. Paired t-values for tests of the null hypothesis that the mean assessments do not differ between business and agricultural graduates are significant at or below the 10% level for nine of the 22 KSATs. Business graduates had higher mean assessments for seven of these nine KSATs: speaking effectively to groups, understanding of basic business principles, using computer tech-nology, knowledge of cultural/economic differences in international business, understanding of how the US economy works, understanding of the global nature of business, and understanding of the interdependence of business functions/departments. Agricultural graduates had higher mean assessments for two of the nine KSATs: ability to use good decision-making techniques in solving problems and ethical behavior on a personal level.

Table 5 summarizes the assessments of all respondents who had supervised business and/or agricultural graduates. The null hypothesis that the mean assessments of business and agricultural graduates are equal can be rejected at or below the 10% level for only four of the 22 KSATs. Business graduates had higher mean assessments for understanding of basic business principles, knowledge of cultural/economic differences in international business, and understanding of how the US economy works; and agricultural graduates had a higher mean assessment for ability to resolve conflicts with work team members.

We tested whether there were any statistically significant differences in the mean KSAT assessments for the business graduates and for the agricultural graduates for the 14 of the 22 KSATs that could, in our judgment, be affected by the graduates' collegiate training/experience. The null hypothesis that the 14 KSATs have the same assessment means can be rejected at below the 1% significance level for either business graduates (calculated $F_{13,3001} = 35.85$, p-value < 0.0001) or for agricultural (calculated $F_{13,872} = 10.49$, p-value < 0.0001) graduates. We then used a Least-Significant-Difference (LSD) criterion to maintain a 5% significance level in testing for differences in the individual mean KSAT assessments (Ott and Longnecker, pp. 440-444)). The results for business and agricultural graduates are shown in Tables 6 and 7, respectively. In terms of the rank ordering of the mean assessments of these 14 KSATS, six (KSATs 2, 6, 7, 10, 12, 17) rank in the top 50% and six (KSATs 8, 9, 11, 14, 15, and 16) are in the bottom 50% for both agricultural and business graduates.[4] Understanding of basic business principles (KSAT 5) ranks in the top 50% for business graduates and in the bottom 50% for agricultural graduates, while the ability to resolve conflict with members of a work team (KSAT 18) ranks in the top 50% for agricultural students and in the bottom 50% for business graduates. Tables 6 and 7 show that both business and agricultural students are weakest in their understanding of the global

nature of business and their knowledge of cultural and economic differences in international business.

Discussion

As the first step in understanding the similarities and differences between agricultural and business graduates, it is useful to examine the course and curricula requirements of the accrediting bodies for business schools. The major accrediting body is the Association to Advance Collegiate Schools of Business International (AACSB). The AACSB (p.68) does not specify specific courses required for accreditation, but does require that accredited undergraduate business programs include "… learning experiences in such general knowledge and skill area as:" communication, ethical understanding and reasoning, analytic skills, multicultural understanding, financial theories, creation of value through the integration of production and distribution, group dynamics, statistical analysis, and domestic and global environments. The second accrediting body for business schools is the Association of Collegiate Business Schools and Programs (ACBAP). The ACBAP (p. 36) says that "(i)n order to prepare business graduates for professional careers, the curriculum must encompass subjects dealing with the specifics of the global work place and the more general aspects of global society. Since business graduates must be equipped to interact with other members of society, adapt to societal changes, and serve as business advocates, students must be encouraged to study global topics that will prepare them for these challenges." Accreditation by the ACBAP requires curricula to have a "Common Professional Component" consisting of coursework in: functional areas (finance, accounting, management), business environment (legal, economics, ethics, global dimensions), technical skills (information systems, quantitative techniques/statistics) and integrative areas (business policies or comprehensive/integrating experience).

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The low average ratings for "understanding of the global nature of business today" and "knowledge of the cultural and economic differences in international business" in our survey indicate that business programs have not succeeded in providing their graduates with either "multicultural and diversity understanding … (and) management-specific knowledge of domestic and global economic environments of organizations (AACSB, p. 68)" or knowledge of "subjects dealing with the specifics of the global workplace and the more general aspects of global society (ACBAP, (p.36)." Fugate and Jefferson indicated that the need to internationalize business curricula has been recognized since the 1960s. They stated (p.2) that "(b)ecause business programs at colleges and universities traditionally have been viewed as training grounds for business America, such institutions have assumed and/or been assigned the task of preparing the task of preparing a corps of graduates who can manage on a global level. … However, the results have been less than spectacular, and there is apparent widespread disenchantment with the educational community's ability to prepare the number and quality of graduates needed for jobs that span international borders." Our results for business graduates agree with their observation.

Agricultural graduates receive even lower mean assessments for their "understanding of the global nature of business today" and "knowledge of the cultural and economic differences in international business." Writing in 1987, Williams (pp. 51-52) said "(a) … characteristic affecting the potential marketability of agricultural economics graduates, emphasis on international education, appears to be generally negative. … Few departments, to my, knowledge, have a genuine commitment to international economic education. Commitment requires more than a course or two in foreign trade or participation of faculty in foreign economic development contracts. Students … need expanded learning experiences on economic, cultural, and institutional interdependencies in the world community." Lesch and Wachenheim surveyed Agricultural

Economics Chairs at the 52 land-grant universities to determine the extent to which their under-graduate curricula had been "internationalized." On average, the Chairs were neutral when asked whether they agreed or disagreed with the statement that their curricula were sufficiently internationalized. Harris, Miller, and Wells compiled curriculum requirements for the 2001-2002 school year at 112 U.S. institutions that offer undergraduate programs in agricultural economics and/or agribusiness. On average, undergraduate agribusiness and agricultural economics programs require less than two hours of coursework that emphasizes international/global economic and business issues.[5]

This survey did not ask the respondents to rank the importance of the KSATs, so these results cannot be interpreted as showing a clear mandate by agribusiness firms to increase the globalization/ internationalization of agricultural and business curricula. All firms may not value an understanding of global business. Among domestic agribusiness firms with an international focus, international KSATs were not ranked in the top five KSATs required of entry-level employees (Wachenheim and Lesch). The lack of interest of some firms in globalization is suggested by the lower 'n' in Tables 4 and 5 for KSATs 11 and 15, which are the two internationalization KSATs. Our own view is that the importance of international KSATs will not diminish over time, and will likely increase.

Fugate and Jefferson reviewed proposals for improving students' international education. These proposals include: international travel study tours for students, student exchange programs, required coursework in international business, coverage of global issues in all business core courses, use of international students as a teaching resource, increasing corporate and government support for international education initiatives, and strengthening of AACSB- and ACBSP- accreditation requirements for international education. Williams (p. 52) argued that the

"Peace Corps, viewed as a two-year internship, may well be the best avenue for gaining international expertise." The respondents to the Wachenheim and Lesch survey of agribusiness firms ranked foreign language competency, international communication coursework, and international business coursework as the three most important KSATs required of entry-level employees with international responsibilities.

Business graduates receive higher mean assessments than agricultural graduates for their "understanding of basic business principles." This is not surprising because the agricultural graduates include agronomy, animal science, horticulture, and other agricultural majors in addition to agricultural economics/agribusiness majors. Given the broad array of agricultural majors, it is surprising that business graduates did not more clearly "outshine" the agricultural graduates. We are not aware of any research detailing the business/economics course requirements across agricultural majors. At our institution, agricultural curricula (other than agricultural economics/agribusiness) require between three hours (microeconomic principles) and 18 hours of business/economics/agribusiness coursework. Many of these agricultural graduates will be employed in business/management occupations Goecker et al. (2005b). Our results indicate that these agricultural graduates would benefit from introductory agribusiness management and/or general business management coursework.

Both business and agricultural graduates receive relatively low mean assessments for their "understanding of the interdependence of business functions/departments" and their "ability to make decisions in the face of incomplete information and risk." It is surprising that business graduates do not clearly "outshine" agricultural graduates in the former KSAT. Per business program accreditation guidelines, business students should have knowledge of "integrated production of goods, services, and information (AACSB, p. 69)" and/or have taken integrative

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coursework (ACBAP). While agricultural economics/agribusiness curricula would be expected to have addressed these KSATs, most other agricultural curricula would not.

Recent research by Pagell suggests that most firms have not integrated their supply, production and distribution functions internally and even fewer have successfully done this with other members of their supply chains. It may be that there is in general a low level of understanding in both business and academia on how to integrate the various functions within a firm to increase the value-added for the customer. So, the poor score on the ability of graduates to integrate suggests the need to create additional educational tools such as simulations, which will enhance the students understanding of the benefits of integration and the means of achieving integration through repeated practice and analysis of business systems.

Previous research suggests that the interpersonal KSATs should not differ between agricultural and business graduates. The only interpersonal KSAT for which the mean assessments of agricultural and business graduates differ at the 5% level is "ethical behavior on a personal level" when the assessments are made by respondents who had supervised both graduate types (Table 4). This may be due to sampling error. Thus, our survey results are consistent with the literature in this regard.

Future research is needed to evaluate whether there are significant differences between the abilities of accredited and non-accredited business schools to provide these KSATs to their students. The current survey did not evaluate whether the business school graduates are from accredited or non-accredited institutions. Future research should also identify the major area of study of both the agricultural and business school graduates, as well as their current positions in their respective firms. This would allow researchers to establish a set of controls in their research design which would provide valuable information for curriculum design.

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Footnotes

1.   Recent research by Lee, Ogunfowora, and Ashton supports the existence of a sixth personality factor, Honesty-Humility (a measure of sincerity, fairness, pretentiousness, greediness, etc.).

2.   We would have preferred to have included the top ten firms in terms of employment, but employment data are not available for all of the firms in the database. The simple correlation between sales and employment is 0.78 for the firms in our sample for which both sales and employment data are available.

3.   A reviewer has pointed out that there may be an upward bias in the results on two counts. First, the employees were already hired and would be expected to possess the KSATs deemed important by the respondents. Second, respondents responsible for hiring decisions would have a personal stake in the outcomes of their hiring decisions and might be reluctant to acknowledge deficiencies in the KSATs of their hires. We acknowledge the potential for an upward bias. However, this upward bias of individuals should be the same across graduates of both business schools and agribusiness schools. So, the relative results of the survey should remain the same.

4.   The Spearman rank-order correlation coefficient for the business and agriculture graduate assessments is 0.763 (p-value = 0.0015).

5.   Students may be exposed to international/global issues by their "infusion" in courses across the curriculum (Lesch and Wachenheim). Thus, the average credit hours reported by Harris, Miller, and Wells understate students' exposure to these issues.

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Table 1. Surveys of Knowledge, Skills, Abilities and Traits (KSATs) Required for New College Graduates

Author(s)	Degree	Respondents	Top KSATs
Andelt, Barrtee, & Bosshamer	Agriculture	All employers	Communication Leadership Computer
Broder & Houston	Agriculture (7 majors)	Agribusiness	Communication Leadership Internships
Cole & Thompson[a]	Agriculture	Agribusiness	Writing Hands-on experience Internships
Klein	All	Agribusiness	Teamwork Communication Motivation
Litzenberg & Schneider	All	Agribusiness	People Communication Economic
Suvedi & Heyboer[a]	Agriculture	All employers	Math Writing Computer
Wachenheim & Lesch	Agriculture	Agribusiness	People Communication Teamwork
Collier & Wilson	Business	Financial officers	Finance Accounting Ethics
Gaedeke, Tootelian, & Schaffer	Marketing	Personnel managers	Communication Enthusiasm Self-confidence
Hafer & Hoth	Marketing & Business	Employers & students	Motivation Initiative Interpersonal skills
Kimball	Business	Sales managers	Oral communication Intelligence Leadership
Lammers *et al.*	Marketing	Recruiters	Social interaction Self confidence Professional poise
McDaniel & White	Marketing	Recruiters	Communication Work ethic Initiative

McWilliams & Pantalone	Finance	Financial officers	Financial Analysis Accounting Communication
Schmidt	Marketing	All employers	Realistic expectations Communication
Tomkovick, Erffmeyer, & Hietpes	Marketing	Recruiters	Communication Enthusiasm Self-Confidence

a. Listed KSATs are those for which graduates are weakest.

Table 2. Agribusiness Industries in the Survey.

NAICS Code	Industry Description	Employment in 1997	Sales ($1000s) in 1997
	Manufacturing		
311	food	1,468,778	423,262,220
312	beverage & tobacco	176,119	96,932,891
3253	pesticide, fertilizer, other ag. chemicals	37,067	24,247,602
33311	agricultural, lawn & garden implements	94,847	23,363,932
333294	food product machinery	18,401	2,797,959
	Wholesale		
42182	farm & garden equipment	101,413	39,713,264
4224	grocery & related product	854,919	588,970,062
4225	farm product	97,521	166,786,245
4228	alcoholic beverage	151,677	69,703,203
42291	farm supply	74,508	53,634,309
42293	flower, nursery, & florists' supply	44,939	8,002,830
42294	tobacco & tobacco product	57,046	50,268,772
	Retail		
4442	lawn, garden equipment & supplies	165,616	31,677,905
445	food & beverage	2,893,074	401,764,499
	Service		
49313	farm product warehousing & storage	5,280	673,198
52313, 52314	commodity contract dealers & brokers	17,763	5,275,172
5416	consulting	511,252	63,428,740
56171	exterminating & pest control	81,214	4,910,668
722	food services & drinking places	7,754,567	251,941,763
	Totals	14,606,001	2,307,355,234

Source: U. S. Department of Commerce. *1997 Economic Census*.

Table 3. Areas Supervised by the Survey Respondents, by Graduate Type Supervised.

Area Supervised	Graduate Type Supervised		
	Business (n=164)	Agriculture (n=19)	Business & Agriculture (n=49)
	--% --		
Human resources	58[a]	42	59
Production/operations management	37	68	39
Finance/accounting	34	26	39
Sales/marketing	30	26	45
Other	15	16	24

a. Percentages do not total to 100 because some respondents supervised multiple areas.

Table 4. Assessments of Business and Agricultural Graduate Competencies by Supervisors of both Types of Graduates.[a]

Item	Knowledge, Skill, Ability, Trait (KSAT)	Business mean	Agriculture mean	n	MSL[b]
1	Ability to be a good leader	3.43	3.43	37	1.00
2	Ability to speak effectively to groups	3.55	3.33	36	0.06
3	Ability to listen well	3.36	3.46	39	0.25
4	Ability to relate well to many different kinds of people, including non-Americans	3.56	3.34	32	0.11
5	Understanding of basic business principles	3.43	2.98	40	<0.01
6	Ability to use the right tools in solving business and work problems	3.47	3.31	36	0.14
7	Ability to use good decision-making techniques in solving problems	3.45	3.63	38	0.07
8	Ability to make decisions in the face of incomplete information and risk	2.94	2.97	36	0.77
9	Ability to negotiate	3.09	3.06	34	0.79
10	Ability to use computer technology (e.g., spreadsheets, databases, multimedia)	4.28	4.03	40	0.02
11	Knowledge of the cultural and economic differences in international business	3.22	2.74	23	0.02
12	Knowledge of business ethics	3.36	3.31	39	0.57
13	Ethical behavior on a personal level (e.g., work ethic, fairness with others)	3.76	3.95	38	0.02
14	Understanding of how the U.S. economy works	3.36	2.88	33	<0.01
15	Understanding of the global nature of business today	3.03	2.68	31	<0.01
16	Understanding of the interdependence of business functions/departments	3.16	2.86	37	0.03
17	Ability to work effectively and efficiently on a work team	3.75	3.70	40	0.54
18	Ability to resolve conflict with members of a work team	3.36	3.42	36	0.57
19	Enthusiasm	3.82	3.90	39	0.32
20	Self-confidence	3.79	3.79	39	1.00
21	Initiative	3.46	3.62	39	0.23
22	Professionalism	3.74	3.72	39	0.79

a. The assessment scale is: 5 = very strong, 4 = somewhat strong, 3 = neither strong nor weak, 2 = somewhat weak, and 1 = very weak.

b. Marginal significance level (p-value) of the paired t-test of the null hypothesis that the KSAT mean assessments do not differ between business and agricultural graduates.

Table 5. Summary of Assessments of Business and Agricultural Graduate Competencies by all Supervisors.[a]

Item	Knowledge, Skill, Ability, Trait (KSAT)	Business mean	Business n	Agriculture mean	Agriculture n	MSL[b]
1	Ability to be a good leader	3.42	224	3.62	67	***0.20***
2	Ability to speak effectively to groups	3.40	218	3.48	66	0.54
3	Ability to listen well	3.65	227	3.59	70	0.65
4	Ability to relate well to many different kinds of people, including non-Americans	3.81	215	3.62	58	0.19
5	Understanding of basic business principles	3.53	229	3.09	68	<0.01
6	Ability to use the right tools in solving business and work problems	3.55	226	3.40	65	***0.27***
7	Ability to use good decision-making techniques in solving problems	3.56	227	3.62	66	0.62
8	Ability to make decisions in the face of incomplete information and risk	3.02	219	3.09	65	0.57
9	Ability to negotiate	2.97	216	3.13	61	0.26
10	Ability to use computer technology (e.g., spreadsheets, databases, multimedia)	4.33	228	4.13	69	***0.11***
11	Knowledge of the cultural and economic differences in international business	2.99	160	2.65	43	0.06
12	Knowledge of business ethics	3.47	224	3.36	69	0.41
13	Ethical behavior on a personal level (e.g., work ethic, fairness with others)	3.90	225	4.03	67	0.31
14	Understanding of how the U.S. economy works	3.29	207	3.08	60	0.10
15	Understanding of the global nature of business today	3.08	192	2.88	58	0.14
16	Understanding of the interdependence of business functions/departments	3.18	225	3.05	64	0.30
17	Ability to work effectively and efficiently on a work team	3.77	226	3.87	68	0.41
18	Ability to resolve conflict with members of a work team	3.28	218	3.50	64	0.10
19	Enthusiasm	4.10	226	3.96	68	***0.26***
20	Self-confidence	3.96	225	3.91	68	0.65
21	Initiative	3.77	225	3.72	69	0.74
22	Professionalism	3.77	226	3.79	67	0.84

a. The assessment scale is: 5 = very strong, 4 = somewhat strong, 3 = neither strong nor weak, 2 = somewhat weak, and 1 = very weak.

b. Marginal significance level (p-value) of the t-test that the KSAT mean assessments do not differ between business and agricultural graduates. Values in ***bold italic*** (regular) font are based on the assumption of unequal (equal) variances, pre-tested at the 20% level.

Table 6. Multiple Comparisons of Mean Assessments of Business Graduate Competencies by all Supervisors.[a]

Item	Knowledge, Skill, Ability, Trait (KSAT)	Mean	Group[b]						
			A	B	C	D	E	F	G
10	Ability to use computer technology	4.33	X						
17	Ability to work effectively and efficiently on a work team	3.77		X					
7	Ability to use good decision-making techniques in solving problems	3.56			X				
6	Ability to use the right tools in solving business and work problems	3.55			X				
5	Understanding of basic business principles	3.53			X				
12	Knowledge of business ethics	3.47			X				
2	Ability to speak effectively to groups	3.40			X	X			
14	Understanding of how the U.S. economy works	3.29				X	X		
18	Ability to resolve conflict with members of a work team	3.28				X	X		
16	Understanding of the interdependence of business functions/departments	3.18					X	X	
15	Understanding of the global nature of business today	3.08						X	X
8	Ability to make decisions in the face of incomplete information & risk	3.02						X	X
11	Knowledge of cultural & economic differences in international business	2.99							X
9	Ability to negotiate	2.97							X

a. The assessment scale is: 5 = very strong, 4 = somewhat strong, 3 = neither strong nor weak, 2 = somewhat weak, and 1 = very weak.

b. Xs within a Group column indicate that the corresponding KSAT means do not differ at the 5% level based on the Least Significant Difference (LSD) criterion. Here, the LSD is 0.1697.

Table 7. Multiple Comparisons of Mean Assessments of Agricultural Graduate Competencies by all Supervisors.[a]

Item	Knowledge, Skill, Ability, Trait (KSAT)	Mean	Group A	B	C	D	E	F	G
10	Ability to use computer technology	4.13	X						
17	Ability to work effectively and efficiently on a work team	3.87	X	X					
7	Ability to use good decision-making techniques in solving problems	3.62		X	X				
18	Ability to resolve conflict with members of a work team	3.50			X				
2	Ability to speak effectively to groups	3.48			X				
6	Ability to use the right tools in solving business and work problems	3.40			X	X			
12	Knowledge of business ethics	3.36			X	X	X		
9	Ability to negotiate	3.13				X	X	X	
5	Understanding of basic business principles	3.09				X	X	X	
8	Ability to make decisions in the face of incomplete information & risk	3.09				X	X	X	
14	Understanding of how the U.S. economy works	3.08				X	X	X	
16	Understanding the interdependence of business functions/departments	3.05					X	X	
15	Understanding of the global nature of business today	2.88						X	X
11	Knowledge of cultural & economic differences in international business	2.65							X

a. The assessment scale is: 5 = very strong, 4 = somewhat strong, 3 = neither strong nor weak, 2 = somewhat weak, and 1 = very weak.

b. Xs within a Group column indicate that the corresponding KSAT means do not differ at the 5% level based on the Least Significant Difference (LSD) criterion. Here, the LSD is 0.3345.