AN ASSESSMENT OF THE EMPLOYABILITY SKILLS NEEDED BY GRADUATES IN THE COLLEGE OF AGRICULTURE, FOOD AND NATURAL RESOURCES AT THE UNIVERSITY OF MISSOURI

J. Shane Robinson, Assistant Professor
Oklahoma State University
Bryan L. Garton, Professor
University of Missouri

Abstract

The purposes of this descriptive study were to assess graduates' perception of the importance and competence levels of performing identified transferable skills in the workplace and use the Borich (1980) needs assessment model to identify the skills most in need to enhance the curriculum. The findings revealed that solving problems, working independently, and functioning well in stressful situations were perceived by graduates as being most important to their job, and identifying political implications of the decisions to be made was the least important. In terms of competence, graduates perceived themselves to be most competent at working independently, relating well with supervisors, and working well with fellow employees and least competent at identifying political implications of the decisions to be made. When using the Borich model, solving problems, allocating time efficiently, communicating ideas verbally to groups, and accepting constructive criticism were the skills with the highest mean weighted discrepancy score, indicating a high need for curriculum enhancement.

Introduction/Theoretical Framework

Numerous studies have noted the importance for graduates from higher education institutions to possess transferable skills prior to entering the workplace (Atkins, 1999; Billing, 2003; Candy & Crebert, 1991; Evers, Rush & Berdrow, 1998; Hewitt, 2005; Hofstrand, 1996). Crebert, Bates, Bell, Patrick, and Cragnolini (2004a) opined that it is becoming increasingly important for graduates to be able to apply the knowledge and skills learned in higher education institutions to the workforce. Evers et al. (1998) stated that "there is a need for a fundamental shift toward an emphasis on general skills in education" (p. 12). However, research has hinted that entry-level graduates are not equipped with the general, transferable skills necessary for employment and thus are not prepared to enter the workforce (Becker, 1993; Brown, Hesketh, & Williams, 2003; Crebert, Bates, Bell, Carol-Joy & Cragnolini, 2004b; Peddle, 2000; Tetreault, 1997). In fact, graduates perceive that many of the employability skills needed in the workforce to be more important than their actual ability to perform said skills (Radhakrishna & Bruening, 1994).

Dunne and Rawlins (2000) asserted that a reason for graduates being ill-prepared to apply the transferable skills to their work is the fact that students often fail to realize the importance of possessing transferable skills and assume that mastery of technical skills within disciplinary content is more important to employees. However, research has shown that skills such as solving problems, communicating effectively, working on a team, thinking critically, and possessing interpersonal skills (Billing, 2003; Schmidt, 1999) are the employability skills most desired by employers. Although these transferable, employability skills assist every person entering the workforce, Candy and Crebert (1991) concluded many graduates are not prepared in these areas.

The blame for the lack of graduate preparation prior to entering the workforce

should not rest solely on graduates. Researchers have noted a "skills gap" is occurring between the demands of employment and the level of educational preparation of graduates (Andrews & Wooten, 2005; Askov & Gordon, 1999; Atkins, 1999; Evers et al., 1998; Kivinen & Ahola, 1999; Kivinen & Silvennoinen, 2002; Morley, 2001; Robinson, 2000; Shivpuri & Kim, 2004; Understanding Employers', 1998). Specifically, employers do not feel as though higher education is succeeding in adequately developing the employability skills of graduates (Peddle, 2000).

A common belief in industry is that higher education institutions should equip graduates with the proper skills necessary to achieve success in the workplace. However, before higher education institutions can be held accountable for providing such skills, a series of basic questions should be answered: What skills are most important for graduates in performing their job? How competent are graduates at performing these skills? How can the current curriculum be enhanced to include the necessary skills to better prepare future graduates for the workplace?

The theoretical framework for this study is based on the Human Capital Theory. Swanson (2001) defined human capital as an investment in people, while van Loo and Rocco (2004) stated that it "is an . . . investment in skills and knowledge" (p. 99). Often times, this investment is employed to enhance knowledge and skills of employees in hopes of increasing worker productivity (Swanson; van Loo & Rocco). Higher education systems can increase human capital by improving the skills of its graduates (Knight & Yorke, 2003). Becker (1993) posited that "education and training are the most important investments in human capital" (p 17). In addition, van Loo and Rocco concluded that, "in early human capital literature, educational background was considered one of the most important determinants of human capital" (p. 99).

In addition to Human Capital Theory, the Secretary's Commission on Achieving Necessary Skills (SCANS) was also used as a theoretical lens for this study. In 1991, the SCANS report (U.S. Dept. of Labor) was published in an attempt to define the skills needed by employees in the workplace. This report defined three key elements: functional skills, enabling skills, and scenario. Functional skills were used to describe the actual functions workers perform in their specific job. Enabling skills were defined as skills workers learn as a result of attending formal education and participating in school related activities. Enabling skills require specific training to apply knowledge which enables workers to perform their jobs. Scenario was the term used to describe how the skills were applied in the work setting to produce a particular outcome.

After further inquiry, the commission was able to refine the three key elements into specific skills. Five skills were determined to be related to functional skills. These five were resource management, information management, social interaction, understanding of systems behavior and performance, and human and technology interaction. Resource management dealt with the outcomes associated with the organization (managing plans, budgets, and resources). Information management consisted of both oral and written communication skills. Social interaction included developing teamwork skills. Understanding of systems behavior and performance dealt with developing problem solving and analytic skills. Finally, human and technology interaction included the ability needed to select the proper technology and media for job tasks.

Purpose/Objectives

The purpose of this study was to assess the employability skills of graduates in the College of Agriculture, Food and Natural Resources (CAFNR) at the University of Missouri. The study sought to assess graduates' perceptions regarding level of importance of identified employability skills and their self-perceived level of competence in performing those skills. The following objectives guided the study:

1. Describe graduates' perceptions of the importance of the employability skills needed for the workforce.

2. Describe graduates' self-perceived level of competence in performing the employability skills.
3. Prioritize the employability skills, according to graduates, in need of curriculum enhancement using Borich's mean weighted discrepancy score (MWDS) approach.

Methods/Procedures

The population for this study was CAFNR graduates at the University of Missouri (MU) from January 2004 to May 2005 (N = 711). It was determined that a random sample of 290 graduates was needed to appropriately generalize findings to the population (Krejcie & Morgan, 1960). A 67-item questionnaire was adapted from Evers et al. (1998) with responses ranging from 0 = no importance (or competence) to 3 = major importance (or competence). By employing Borich's (1980) MWDS approach to achieve objective 3, both importance and competence constructs were assessed simultaneously. The instrument was reviewed by a panel of experts for face and content validity. To establish the instrument's reliability, it was disseminated to 100 graduates who were not included in the sample; this resulted in a Cronbach's alpha of .94.

Dillman's (2004) total design method was used to collect data. However, upon mailing the initial postcards, a valid address was not realized for 18 individuals, thus resulting in frame error. After multiple attempts to secure correct addresses for these individuals failed, they were eliminated from the study, and sample size was reduced to 272. After the initial mailing and subsequent follow-up procedures (Dillman, 2004), 141 usable questionnaires were returned for a 52% response rate. Non-response error was controlled by comparing early and late responses (Miller & Smith, 1983) and no statistical differences were found. Thus, the results of this study hold true for the sample.

Results/Findings

This study is a part of a larger investigation conducted by the researchers, which revealed that 66 (47%) of the respondents were male and 75 (53%) were female with an overall mean GPA of 3.18. Agricultural systems management graduates (87%) had the largest response, followed by agricultural education (74%), and agricultural journalism (73%). The lowest response rates came from graduates with degrees in parks, recreation, and tourism (22%), hotel and restaurant management (28%), and general agriculture and soil and atmospheric sciences (33%). The academic majors possessing the highest grade point averages (GPA) were biochemistry and forestry (GPA = 3.47); the academic major possessing the lowest GPA was general agriculture (GPA = 2.56).

For the purpose of this manuscript, data are displayed in Table 1. The items (i.e., employability skills) were ranked from high to low according to their MWDS. Objective 1 sought to describe graduates' perceptions of importance regarding the employability skills needed for the workforce. Four employability skills were found to have mean importance ratings larger than 2.80. The four items were "solving problems" (M = 2.87, SD = .38), "functioning well in stressful situations" (M = 2.84, SD = .38), "ability to work independently" (M = 2.84, SD = .45), and "maintaining a positive attitude" (M = 2.81, SD = .46).

Table 1
Graduates' Perceptions of the Importance of Employability Skills and Their Levels of Competence in Performing the Skills (n = 141)

	Importance		Competence		
Employability Skills	*M*	*SD*	*M*	*SD*	MWDS
Category I					
Solving problems	2.87	.38	2.69	.56	1.30
Allocating time efficiently	2.76	.52	2.49	.61	1.22
Communicating ideas verbally to groups	2.64	.61	2.36	.71	1.09
Responding positively to criticism	2.65	.61	2.39	.67	1.07
Functioning well in stressful situations	2.84	.38	2.65	.58	.97
Keeping up-to-date on developments	2.56	.68	2.27	.66	.95
Identifying problems	2.77	.47	2.52	.59	.92
Recognizing the effects of decisions made	2.63	.54	2.34	.71	.90
Assessing long-term effects of decisions	2.50	.66	2.24	.70	.89
Identifying components of problems	2.57	.55	2.30	.70	.86
Prioritizing problems	2.65	.51	2.39	.57	.85
Functioning at optimal performance	2.74	.53	2.45	.65	.84
Adapting to situations of change	2.62	.63	2.31	.71	.81
Category II					
Maintaining a positive attitude	2.81	.46	2.55	.64	.79
Making decisions on thorough analysis	2.54	.63	2.24	.65	.76
Keeping-up-to-date with external realities	2.27	.95	2.12	.59	.73
Establishing critical events to be completed	2.49	.74	2.24	.77	.73
Conveying information one-to-one	2.63	.59	2.32	.64	.70
Recognizing alt. routes in meeting obj's.	2.36	.68	2.19	.70	.69
Managing/overseeing several tasks at once	2.69	.51	2.43	.77	.64
Setting priorities	2.77	.50	2.51	.67	.64
Listening attentively	2.79	.43	2.53	.65	.64
Initiating change to enhance productivity	2.40	.79	2.19	.68	.60
Providing novel solutions to problems	2.33	.67	2.17	.76	.57
Conceptualizing a future for the company	1.94	.93	1.87	.71	.56
Making decisions in a short time period	2.46	.64	2.22	.61	.55

Employability Skills	Importance *M*	Importance *SD*	Competence *M*	Competence *SD*	MWDS
Providing innovation to company's future	1.90	.95	1.87	.81	.53
Identifying potential negative outcomes	2.27	.86	2.14	.83	.52
Category III					
Sorting out relevant data to solve problems	2.34	.63	2.19	.75	.49
Revising plans to include new information	2.40	.71	2.21	.76	.47
Gaining new knowledge everyday	2.67	.58	2.42	.65	.47
Combining relevant info. from sources	2.43	.74	2.22	.75	.46
Ability to work independently	2.84	.45	2.65	.55	.44
Monitoring progress against the plan	2.21	.75	2.09	.69	.43
Assigning/delegating responsibility	2.17	.76	2.08	.66	.42
Gaining new knowledge outside the job	2.30	.77	2.14	.63	.42
Maintaining a high energy level	2.51	.66	2.24	.69	.42
Giving direction and guidance to others	2.46	.71	2.22	.64	.41
Meeting deadlines	2.66	.63	2.40	.67	.39
Monitoring progress toward risky ventures	2.05	.83	1.96	.82	.37
Responding to others' comments	2.55	.58	2.27	.77	.37
Establishing good rapport w/ subordinates	2.67	.67	2.40	.53	.37
Reconceptualizing roles of the corporation	1.84	1.01	1.61	.78	.37
Knowing ethical implication of decisions	2.39	.82	2.19	.70	.35
Applying info. to new or broader contexts	2.11	.74	2.04	.80	.32
Working well with fellow employees	2.77	.49	2.52	.66	.31
Category IV					
Contributing to group problem solving	2.27	.68	2.14	.72	.29
Resolving conflicts	2.30	.82	2.14	.65	.29
Integrating strategic considerations in plans	2.00	.74	1.91	.85	.25
Relating well with supervisors	2.75	.54	2.49	.66	.25
Understanding the needs of others	2.49	.66	2.24	.75	.24
Delegating work to peers	2.09	.87	1.98	.78	.20
Making effective business presentations	2.11	.93	2.01	.74	.13
Integrating info. into general contexts	2.14	.74	2.08	.81	.12

Employability Skills	Importance *M*	Importance *SD*	Competence *M*	Competence *SD*	MWDS
Identifying political implications	1.53	.90	1.46	.80	.11
Writing internal business communication	2.01	.91	1.93	.77	.11
Supervising the work of others	2.25	.89	2.11	.80	.09
Coordinating the work of peers	2.01	.88	1.95	.59	.08
Coordinating the work of subordinates	2.14	.96	2.04	.78	.03
Making impromptu presentations	1.88	.96	1.66	.83	-.01
Identifying conflict among people	2.09	.83	2.01	.75	-.02
Empathizing with others	2.25	.79	2.12	.77	-.05
Writing external business communication	1.87	1.00	1.63	.86	-.07
Writing reports	1.98	.95	1.89	.87	-.44
Using proper grammar, spelling, & punct.	2.57	.71	2.28	.70	-1.53

Note. Scale: 0 = No Importance/Competence, 1 = Minor Importance/Competence, 2 = Moderate Importance/Competence, 3 = Major Importance/Competence.

In addition, seven items received a mean importance of less than 2.00. The seven items were "writing reports" (M = 1.98, SD = .95), "conceptualizing a future for the company" (M = 1.94, SD = .93), "providing innovative paths for the company to follow for future development" (M = 1.90, SD = .95), "making impromptu presentations" (M = 1.88, SD = .96), "writing external business communications" (M = 1.87, SD = 1.00), "reconceptualizing your role to changing corporate realities" (M = 1.84, SD = 1.01), and "identifying political implications of the decisions to be made" (M = 1.53, SD = .90).

Objective two sought to describe graduates' self-perceived level of competence in performing the employability skills. The top five employability skills graduates perceived themselves to be most competent in performing included "solving problems" (M = 2.69, SD = .56), "ability to work independently" (M = 2.65, SD = .55) and "functioning well in stressful situations" (M = 2.65, SD = .58), "maintaining a positive attitude" (M = 2.55, SD = .64), and "listening attentively" (M = 2.53, SD = .65). The bottom six employability skills graduates perceived themselves to be least competent at performing included "conceptualizing a future for the company" and "providing innovation to the company's future" (M = 1.87, SD = .81), respectively, "making impromptu presentations" (M = 1.66, SD = .83), "writing external business communication" (M = 1.63, SD = .86), "reconceptualizing the role of the corporation" (M = 1.61, SD = .78), and "identifying political implications of the decisions to be made" (M = 1.46, SD = .80).

Objective three sought to prioritize the employability skills, as perceived by graduates based on MWDS (Borich, 1980). The Borich model allows two ratings of perceptions to be taken into account simultaneously in an effort to determine where discrepancies may exist.

For the purpose of this study, a discrepancy score was calculated by subtracting the importance rating from the competence rating for each graduate on each employability skill. A weighted discrepancy score was then calculated by multiplying each discrepancy score by the mean importance rating for that employability skill. Lastly, a MWDS was calculated by summing the weighted discrepancy scores for each skill and dividing that total by the number of respondents (n = 141).

To prioritize the employability skills for future curriculum enhancement, the skills were placed in four categories based on the mean weighted discrepancy scores. Category I consisted of all employability skills with a MWDS greater than .80 and was considered the highest discrepancy and highest need for curriculum enhancement. Category II consisted of all employability skills with a MWDS ranging from .50 to .79 (i.e., a more moderate discrepancy and need for curriculum enhancement). Category III consisted of all employability skills with a MWDS ranging from .30 to .49 (i.e., a low discrepancy and need for curriculum enhancement). Category IV consisted of all employability skills with a MWDS below .30 (i.e., a negligible discrepancy and need for curriculum enhancement). As a result, 13 employability skill items comprised category I, 15 employability skills comprised category II, 18 employability skills were included in category III, and 21 employability skills formed category IV.

Conclusions

Graduates perceived that all 67 employability skill items were moderately important to entry-level positions in the workplace. So, graduates believed that it is important to be able to solve problems, work independently, deal with stress, stay positive, and listen. This finding is consistent with previous research by Billing (2003) and Schmidt (1999), who found solving problems, communicating effectively, working on a team, thinking critically, and possessing interpersonal skills (Billing; Schmidt) to be the most important employability skills desired by employers. In contrast, graduates rated "writing external business communication" near the bottom of the list of important entry-level employability skills. A possible reason this skill was of little importance to graduates could be due to the fact that the University of Missouri is nationally renowned for its writing intensive program; thus, students who attended MU were well prepared in this skill area, and as such, may fail to realize its importance throughout society.

Graduates rated 60 of the 67 employability skills higher in importance scale than competence. This finding is consistent with Radhakrishna and Bruening's study in 1994 when they found that entry-level employees perceived employability skills to be more important than their ability to perform those skills. The employability skill in greatest need of curricular attention, according to graduates, was problem solving and decision making, because 6 of the 13 items comprising category I identified problem-solving and decision-making skills. Category I was comprised of employability skills with the highest discrepancy scores, i.e., indicating a need for curriculum enhancement in these areas. This finding is consistent with other research conducted by the authors concerning agricultural education graduates. The findings from that study revealed agricultural education graduates lacked employability skills that deal with defining and solving problems and analyzing information in making decisions. So, curriculum enhancement was needed in those areas.

Nineteen percent of the employability skills formed category I, which represented the highest need for curriculum enhancement. Twenty-three percent of the employability skills reached the category II level, which represented a more moderate need for curriculum enhancement. Twenty-seven percent of the items comprised category III, which represented a lower need for curriculum enhancement, and 31% were included in category IV, which indicated a negligible need for curriculum enhancement.

In all, 13 items possessed the highest discrepancy score, which indicated a need to enhance the existing curriculum to include these skills. Fifteen skills comprised category II, which yielded a more moderate discrepancy score. One third of the skills in category II dealt with "creativity, innovation, and change," and "visioning." Three consisted of "organization and time management."

Category III consisted of 19 items with lower discrepancy scores. Of these, four dealt with lifelong learning and motivation-related skills. Therefore, graduates had a lower need to obtain additional information

on lifelong learning and motivation skills. Category IV included 20 skills with a negligible discrepancy score, three of which dealt with supervising and coordinating.

Implications/Discussion

Graduates placed the least amount of importance on the political implications of the decisions they make. This could be because graduates have not yet experienced the ramification of ill-advised decisions in the workplace that may have "political" consequences. At a minimum, graduates perceived themselves to possess at least minor competence in performing all 67 employability skills. Graduates perceived that they were most competent at working independently, relating to their supervisors, working with their colleagues, listening, and setting priorities. Graduates also perceived that they were least competent at "identifying political implications of the decisions to be made." This finding was similar to the importance scale, as graduates perceived the political implications of their decisions to be the least important skill needed for success in the workplace.

When comparing importance and competence, graduates ranked "ability to work independently" second on the importance scale and first on the competence scale. Although graduates rated "solving problems" as the most important skill needed in the workplace, they rated it 16th on the competence scale. It could be implied that graduates need more experience at solving problems. Though the "ability to work independently" was rated high on the importance scale, it was rated even higher on the competence scale, which may indicate the curriculum is adequately addressing graduates' needs in this area.

"Communicating ideas verbally to groups" was a skill identified in category I, but "making effective business presentations" and "making impromptu presentation" were skills included in category IV. Is there a real difference in these three skills? They all represent oral communication. How could one fall into category I (high discrepancy score) and the other two fall into category II (negligible)? Could it be that graduates were confused with the wording on the questionnaire, or, because more than one third (35%) of the skills that comprised construct IV addressed areas of communications, is the existing curriculum already efficiently addressing the entry-level communication needs of graduates?

Also, because over one third of the skills in category II dealt with "creativity, innovation, and change," "visioning," and "organization and time management," it may be that graduates had a "moderate need" to learn more about creativity, visioning, and organization and time management. Further, could it be that these entry-level employees do not need skills in supervising or coordinating the work of peers, or at least not at this point in their careers.

Recommendations

Crebert et al. (2004) opined that it is becoming increasingly important for graduates to be able to apply the knowledge and skills learned in higher education institutions to the workforce. Therefore, CAFNR faculty at MU who wish to enhance their curriculum should start by enhancing their current curriculum to mirror the skills represented in category I. Once all the skills identified in category I are addressed, faculty could then adjust their curriculum to include the skills in category II. It is recommended that while the skills in category IV are currently being addressed, faculty at this institution should continue to provide learning experiences that support the acquisition of skills because they are perceived as being important to graduates.

It is recommended that the agricultural education faculty at MU share the findings of this study with other faculty in the CAFNR. These faculty should provide workshops/trainings to assist other faculty with incorporating strategies for addressing deficiencies or "discrepancies" in the course syllabi and learning outcomes in their courses.

Further research is warranted in this area to better identify which employability skills may be lacking in each department of the CAFNR. Understanding this would enable each department to be clearer on the exact skills needed by its graduates and would

provide direction for curriculum enhancement.

The findings of this study relate closely to the SCANS skills (U.S. Dept. of Labor, 1991). Twenty-one of the 67 skills measured in this study dealt specifically with information management, social interaction, and understanding of systems behavior and performance. Components of the information management skills assessed the need for work in oral and written communications. Specifically, 10 skills in oral and written communication were noted in this study. Components of the social interaction skills included interpersonal skills. Five skills related to social interaction were measured in this study. Components of the understanding of systems behavior and performance skills included problem solving and analytic skills. Six skills related to understanding of systems behavior and performance were assessed in this study. Because higher education has the potential to increase human capital by focusing on and improving the skill deficiencies of its graduates (Knight & York, 2003), it is recommended that CAFNR faculty at the University of Missouri incorporate the skills comprising category I into its existing curriculum in hopes of enhancing graduates' skill abilities, thus improving overall human capital in the workplace.

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J. SHANE ROBINSON is an Assistant Professor in the Department of Agricultural Education, Communications and Leadership at Oklahoma State University, 440 Ag Hall, Stillwater, OK 74078-6032. E-mail: shane.robinson@okstate.edu

BRYAN L. GARTON is a Professor in the Department of Agricultural Education and Interim Associate Dean at the University of Missouri, 2-64 Agriculture Building, Columbia, MO, 65211. E-mail: GartonB@missouri.edu