The Perceived Impact of Life Experiences and Selected Growth Areas Upon the Employability Preparation of Land-Grant College Graduates

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Assessing the Influence of Life Experiences and Growth Areas Upon the Employability Preparation of Land-Grant College Graduates

The purpose of this study was to analyze the perceived impact of life experiences and selected growth areas upon the employability preparation of land-grant college graduates, as observed by employers. The study revealed that a variety of life experiences and experiential learning opportunities, in general, are significant for career success for land-grant college graduates. Further, participants reported that many trends would influence the agricultural industry over the next five to 10 years, such as Digital Agriculture (Precision Agriculture or Big Data), Research and Development, Agricultural Technology, Engineering, and Mechanization, Environment, Globalization, and selected Agribusiness related themes. Recommendations included Land-Grant Colleges considering curriculum and program revisions concerning these trend areas, to better prepare graduates to be future change agents within the global food, agriculture, and renewable natural resources fields.

Introduction

Keywords like turbulence, globalization, networking, innovation, coping with uncertainties, risks, and entrepreneurship are often used to characterize the future of the agricultural sector in the United States. Agricultural colleges are encouraged to develop a more rigorous curriculum to prepare and build today's college students (American Farm Bureau, 2015). Competition with other technical colleges for non-agricultural occupations will increasingly be a way of life. Historical roots in agricultural production will no longer provide land-grant colleges with adequate student enrollments. Land-grant colleges are encouraged to be more responsive to the needs of the global agricultural workforce to prepare graduates with the knowledge base, experiences, and leadership insight to address global agricultural issues. Autonomous and innovative colleges should form the core of the future agricultural land-grant system, a system that can provide leadership for the global food and fiber system (American Farm Bureau, 2015).

Likewise, regarding higher education in agriculture, "As students flock to study subjects they think offer a clear path to a job upon graduation, enrollment is booming" (Krogstad, 2012, para. 1). The overall attractiveness of obtaining a degree in agriculture is driven by the fact that the skills developed in these respective programs address issues such as global hunger, food safety, climate change, the environment, and obesity (Roberts, Harder, & Brashears, 2016). The human population will require an additional 50% increase for food and fiber over the next decades and in some regions, even more than 50% by 2050. The need for a highly trained and well-rounded agricultural professionals will become increasingly important to lead the industry and help address the current and future issues related to agriculture (Hazel & Wood, 2007; Godfray, Beddington, Crute, Haddad, Lawrence, Muir, & Toulmin, 2010).

Maurice Strong once stated, "The combination of population growth and the growth in consumption is a danger that we are not prepared for and something we will need global cooperation on" (Strong, 2010). According to AGree (2012), given the continuing population growth, the overall need for food, the ever-increasing challenges of conserving soil, water, and habitat conservation, combined with improving nutrition and public health, make having a sufficiently trained scientific and professional workforce to address the challenges of the 21st

Century a significant priority for all levels and aspect of agricultural education. With regard to the complexity and array of subject matter encompassed in agriculture, agriculture has drastically changed from just a focus on production agriculture, but now includes the areas of food and nutrition; natural resources; biotechnology, and the fast-emerging field of "big ag data" (Mercier, 2015, p. 1).

As the global job market continues to become more competitive, particularly within the agricultural arena, individuals with some experience and orientation to agriculture will be extremely competitive. According to Goecker, Smith, Fernandez, Ali, and Theller (2015), graduates that have work experience and possess mobility will find a high number of employment opportunities in the agricultural industry, mainly if they are flexible to work internationally. Moreover, individuals who have work experience that is highly related to their careers of interest or that have completed internships in those fields will find favorable conditions for employment in the food, agriculture, renewable natural resources, and environment. Given the multiple skillsets possessed by individuals with expertise and degrees in these areas, it also affords them opportunities to cross over into other fields, which complicates the issue of recruiting and retaining high-quality professionals in the food, agriculture, renewable natural resources, and the environment, even more. Individuals with professional expertise in these fields will become critically important to address issues concerning creating a sustainable environment, food security, and environmental quality.

One major area that has impacted the agricultural industry and is predicted to even more in the future is AgTech or technology in agriculture. During the year 2015, in the industry, investment in technology reached nearly $5 billion (Newman, 2018). Agriculture will become elevated to unforeseen levels of growth and influence with a growing global population and reduced land availability; the utilization of technology as a scalable and sustainable resource, along with industry professionals' willingness to embrace the ever-evolving digital transformation will increase the interest of studies in agriculture. With technologies such as RFID Sensors and Tracking, Machine Learning and Analytics, Farming and Robotics, Drones and Crop Monitoring, IoT and Sensors in Equipment, and overall Big Data the digital transformation of agriculture will have profound positive effects on society and the environment (Newman, 2018).

With the comprehensive nature of the agricultural industry, it is becoming more evident that graduates of land-grant colleges have exposure and experience to international perspectives, which often include culture, political, and economic aspects (National Research Council, 2009). According to the National Research Council (2009), today's agricultural employers recognize, more than ever before, that their personnel will live and work with individuals from all regions of the world and that the interdependence of global agribusinesses, demands that agricultural higher-education expand to meet the need of producing innovative agricultural professionals to lead this massive global enterprise. Jayakumar (2008) emphasized that land-grant universities today must develop and cultivate graduates that will be prepared to result in the worldwide marketplace.

Given the previous factors, employment opportunities for graduates with training and experience in the agricultural sciences through 2020 are robust. Annually, there exists a need for 57,900 graduates with training in the agricultural sciences. Still, only 35,400 graduates are

produced by colleges of agriculture, leaving a 39% gap in agrarian employment, that will have to be filled by individuals with training in related areas, but not agriculture (Goecker, Smith, Fernandez, Ali, & Theller, 2015). What is more, according to projections 46% of the employment opportunities in agriculture will be in Management and Business, 27% in Science and Engineering, 15% in Food and Biomaterials Production, and 12% in Education, Communication, and Governmental Services (Goecker, Smith, Fernandez, Ali, & Theller, 2015). Land-grant college graduates with training and expertise in agriculture, food, renewable natural resources, and the environment will be critically important to the United States' ability to solve issues regarding sustainable energy, environmental quality, and food security.

Agricultural Industry Economic Importance

According to the United States Department of Agriculture Economic Research Services (2019), agriculture, food, and related industries contributed $1.053 trillion to the U.S. gross domestic product (GDP) in 2017, encompassing over one percent of GDP. The actual overall contribution of the agricultural industry to the GDP is more significant, however, primarily because of agricultural related areas such as forestry, fishing, and related functions such as beverage, food, and tobacco products, textiles, apparel, leather products, food, and beverage stores, eating and drinking facilities, all of which rely on agricultural inputs, add value to the overall economy. During 2017, 21.6 million full and part-time jobs were directly related to the food and agriscience sectors, 11% of total U.S. employment. Concerning direct on-farm work that comprised 2.6 million of these jobs. Employment opportunities in agriculture and food-related industries in total accounted for another 19 million jobs. American household expenditures on food amount to 13 percent of household budgets on average. The agricultural sector must maintain a cadre of highly trained professionals equipped with the knowledge, skills, and dispositions to lead the industry and position the agricultural sector for future growth. With the emphasis placed upon the importance of experience related to agriculture for emerging agricultural professionals in the literature, and the perceptions of trends that are currently impacting agriculture and future ones as well, it is vital that employers within the agricultural industry are queried to get their opinions, as these areas affect the employability preparation of land-grant college graduates, as the future professionals that will carry the industry and its collective sectors forward.

Experiential Learning

Given the cited importance of experience for immerging agricultural professionals, pedagogical techniques such as experiential learning have gained increased importance. In recent years, students and employers have embraced an educational approach that allows their students to attain the practical skills that are necessary for the workplace. Students take on responsibilities featuring significant experiences with real outcomes that generate concrete learning achievements through participation and reflection. Experiential learning can have an extremely broad or narrow definition depending on the type and length of the experience. Experiential learning is the knowledge, skills, and abilities that can be defined in terms of a learning model, which begins with the background followed by reflection, discussion, analysis, and evaluation of the experience. The assumption is that students seldom learns from experience unless they assess the expertise, assign their meaning in terms of their own goals, aims, ambitions, and expectations (McLeod, 2017).

The educational goal of institutions of higher learning is to prepare students for professional life. With the use of experiential learning programs, a university offers the ultimate test of a student's attainment of knowledge within the academic program—the student must demonstrate the ability to transfer, apply, and use the knowledge she or he has gained. The students are no longer merely an educated person. They are trained individuals that have the required skills to function, perform, and make decisions in the workplace. The ultimate benefit comes with the acquisition of the specific abilities necessary to complete, combined with the improvement of skills in planning, goal setting, decision-making, interpersonal communication, and problem-solving. These experiences vastly improve the students' chances of gaining quality employment upon graduation (McLeod, 2017).

Futuring

In addition to the focus upon experience, one of the primary objectives of this study concerns the prediction of future growth trends that will impact agriculture and land-grant college graduates, an aim that centers around the concept known as Futuring. Futuring is a process that involves a systematic process of predicting the future, which does not just include numerical prediction and assessment (Fetsch 1990). With this process, the overall goal is to develop expectations about the future and identify the evolving opportunities and threats it presents. This process is done so appropriate strategies can be put in place to achieve the desired outcomes (Cornish 2004). Futuring is not intended to prepare an unchanged set of estimates; rather, it represents the making of decisions that will ensure the successful course of the enterprise and are characterized by flexibility (Millett 2006).

Theoretical Framework

Concerning this study, the Human Capital Theory (Goode, 1959) served as the theoretical framework. Human capital is a concept with many perspectives and definitions. Goode (1959) defined human capital as the knowledge, skills, attitudes, aptitudes, experiences, and required traits contributing to the overall production. Moreover, Van Loo and Rocco (2004) indicated that human capital theory should be considered an investment in human resources for employees to possess the necessary "skills and knowledge" (p. 99), and according to Swanson (2001), human capital is defined as an investment in people. When comparing both Van Loo and Rocco and Swanson, the scholars indicated that this investment is often useful to enhance knowledge and skills of employees for increasing worker output. The economist Gary Becker provided a further refinement to the human capital theory in 1962, in his book entitled *Human Capital* (1993), stating that "education and training are the most important investments in human capital" (p. 17).

Bowles, Gintis, and Osborne (2001) asserted that skills represent individual capacities contributing to production as an argument for the production function. Also, Blundell, Dearden, Meghir, and Sianesi (1999) found that two main components of human capital are highly correlated: new ability (whether acquired through experiences or innate) and skills acquired through formal education or training on the job and cooperative and planned experiences. It is important to note that human capital dramatically differs from other assets, primarily because it yields market returns only in proportion to the worker's supply of labor and experience (Hall & Johnson, 1980). According to Becker (1993), the human capital theory is the most influential economic theory of Western education, particularly with its influence on the workplace. One of

the critical aspects of this theory is the concept of experience as a crucial component for professionals, which is a significant focus of this separate study.

Concerning this study, the Human Capital Theory has a significant emphasis on the importance of experience concerning the composite human capital possessed by individuals. Additionally, for agricultural professionals to be ready to take on future growth trends, they must possess requisite knowledge, skills, and dispositions, which collectively comprise an individual human capital. The Human Capital Theory serves as the foundation of productivity within any professional enterprise.

Purpose and Objectives

The purpose of this study was to analyze the perceived impact of life experiences upon the employability preparation of land-grant college graduates, in addition to determining which growth areas will impact the agricultural industry in the future. The following research objectives were developed:

1. To determine the perceived value of various life experiences upon the employability preparation of land-grant colleges as viewed by employers.

2. To discover from the perspective of employers, what were the future growth areas that will impact agriculture and land-grand college graduates in the next five to ten years.

Methodology

The design for this specific study was a descriptive cross-sectional study (Creswell, 2011). The population for this study consisted of 60 employers representing 54 different governmental and corporate organizations from the agricultural section of an employer database at a major land-grant university. From this database the contact emails were obtained for the respective employer representatives. The employers consisted of state and federal agricultural agencies, plant and animal agribusinesses enterprises, food companies, and agricultural machinery companies as well.

Regarding the survey participants, no direct demographic data was collected. A survey was adapted and modified from a study formerly conducted at the University of Arkansas. The validity of the instrument was established using content and face validity. Brown (1983) defined content validity as “the degree to which items on a test representatively sample the underlying content domain” (p. 487). Brown recommended using expert judges as one means of establishing content validity. The research team established face validity with the aid of a panel of experts.

The web-based survey instrument for this study consisted of four sections. Section one was designed to gauge the opinion of employers regarding the level of preparation of land-grant college graduates concerning their interpersonal skills, communication skills, computer skills, character skills, and technical competency. Section two of the study was designed to gauge the opinion of employers regarding the level of importance of basic work-place knowledge, skills, and abilities for entry-level jobs. Section three was intended to rate the importance of various life

experiences with land-grant college graduate's potential career success. Section four was designed to measure the future growth areas that employers feel will impact or change agriculture for the next five to 10 years. This article reports data resulting from sections three and four of the web-based survey.

For this study, even though the instrument had pre-established levels of reliability, the researchers of this study conducted a post-hoc reliability test after the data collection. Concerning the study, Cronbach's alpha was used as the reliability measure. Nunnally (1967) suggested that .50 to .60 would be high enough in the early stages of research. For survey research, Chronbach's alpha measures of .80 or higher are adequate reliability levels. Chronbach's alpha reliability coefficients for the survey were as follow: *Section One* = .92, *Section Two* = .89, *Section Three* = .93 and *Section Four* = .91. The reliability levels attained for this instrument from previous work were *Section One* = .90, *Section Two* = .91, *Section Three* = .90 and *Section Four* = .93 (Graham, 2001). For the survey section concerning life experiences the following Likert-scale conventions were utilized: *Unimportant* = 1.00 - 1.49; *Somewhat Important* = 1.50 – 2.49; *Important* = 2.50 – 3.49; *Very Important* 3.50 – 4.49; and *Extremely Important* = 4.50 – 5.00. In relation to the survey section concerning growth areas, the following Likert-scale conventions were used: *No Influence* = 1.00 – 1.49; *Some Influence* = 1.50 – 2.49; *Influential* = 2.50 – 3.49; *Very Influential* = 3.50 – 4.49; and *Extremely Influential* = 4.50 – 5.00.

This study utilized a three-round, web-based questionnaire approach. The research team surveyed all 60 employers for the study. Elements of Dillman's Tailored Design Method (2009) were utilized to achieve an optimal return rate. An initial electronic letter was sent informing the potential respondents that they would receive an invitation by email with a link to the survey instrument in approximately two weeks. By the end of week one, the researchers had received 25 completed surveys. A reminder message was sent after week one had passed. By the end of week two, 15 more responses were received. A final note was sent, resulting in 10 more responses. Overall, a final return rate of 83% (n = 50) was accomplished. Non-response error was a relevant concern; to control for non-response error, Miller and Smith (1983) recommend comparing early and late respondents. Procedures for handling non-respondents were followed as outlined, as in Lindner, Murphy, and Briers (2001). An independent samples *t*-test indicated that no significant differences ($p < .05$) existed between the early and late respondents. Regarding data analysis, when considering the descriptive nature of this study and the stated objectives, it was determined that descriptive statistics using measures of central tendency in the form of means would be most appropriate.

Findings

Objective One

Employers were asked to rate a series of life experiences that they perceived as important for success on the job for land-grant university graduates. Table 1 illustrates the importance of these several life experiences. When interpreting the results of Table 1 the following conventions should be utilized**:** *Unimportant* = 1.00 - 1.49; *Somewhat Important* = 1.50 – 2.49; *Important* = 2.50 – 3.49; *Very Important* 3.50 – 4.49; and *Extremely Important* = 4.50 – 5.00 (Graham, 2001). Employers indicated that overall work experience, agricultural internships, agricultural employment, work experiences on a farm, and international experience were essential in

preparation for the workforce. Employers also perceived that having been an active student club member, an officer of a student club, being reared on a farm, and being bilingual were important to employability preparation.

Table 1

Life Experiences Identified as Critical by Employers of Land-Grant University Graduates

Life Experiences	Mean	SD	Mean Rank
1. General work experience	4.50	1.09	1
2. Agricultural internships	4.48	1.33	2
3. Agricultural employment	4.45	0.97	3
4. Work experiences on a farm	4.23	1.21	4
5. Active student club member	4.06	1.44	5
6. International experience	4.03	1.39	6
7. Reared on a farm	3.06	1.11	7
8. Bilingual	3.02	1.09	8
9. Officer of a student club	3.01	0.74	9

Scale: 1 = Unimportant, 2 = Somewhat Important, 3 = Important, 4 = Very Important and 5 = Extremely Important

Objective Two

Employers were asked to rate how future growth areas will influence the agricultural industry in the next five to 10 years. When interpreting the results of Table 1, the following conventions should be utilized: *No Influence* = 1.00 – 1.49; *Some Influence* = 1.50 – 2.49; *Influential* = 2.50 – 3.49; *Very Influential* = 3.50 – 4.49; and *Extremely Influential* = 4.50 – 5.00 (Graham, 2001). In Table 2, employers felt that digital agriculture (precision agriculture/big data), environment, research and development, and agricultural technology, engineering, and mechanization would be extremely influential upon the agricultural industry. Based on the employers' ratings, the following growth areas were perceived as being very influential to the agricultural workforce: International agriculture, marketing; consumer relations; organic foods, management, quality control, and sales. In comparison, education and training and communication were viewed at the level of influential, regarding their potential impact upon the agricultural industry.

Table 2

Growth Areas Identified as Critical by Employers of Lan-Grant University Graduates

Growth Areas	Mean	SD	Mean Rank
1. Digital Agriculture (Precision Agriculture/Big Data)	4.50	0.88	1
2. Research and Development	4.50	0.78	2
3. Environment	4.50	0.62	3
4. Agricultural Technology, Engineering, and Mechanization	4.50	0.51	4
5. International Agriculture	4.42	0.65	5
6. Marketing	4.33	0.87	6
7. Consumer Relations	4.25	0.94	7
8. Organic Foods	4.17	0.82	8
9. Management	3.92	0.88	9
10. Quality Control	3.92	0.88	10
11. Sales	3.83	1.43	11
12. Education and Training	3.33	1.27	12
13. Communication	3.33	1.20	13

Scale: 1 = No Influence, 2 = Some Influence, 3 = Influential, 4 = Very Influential, 5 = Extremely Influential

Conclusions, Recommendations, and Implications

For this study, the impact of select life experiences upon the employability preparation of land-grant colleges was analyzed. It should be noted that items such as general work experience, agricultural internships, agricultural employment, farm work experience, active student-leadership, and membership, and being reared on a farm were necessary for employability preparation. These results are in alignment with Graham (2001), who found the experiences above to be essential for agricultural employment success. Further, employers of land-grant college graduates identified that possessing bilingual skills and having international experiences were critical. These findings are supported by the National Research Council (2009), Jayakumar (2008), and Goecker et al. (2015), who also emphasized the importance of international exposure and experiences for land-grant college graduates as they prepare for the professional agricultural workforce.

When examining the growth areas that will impact the agricultural industry within the next five to 10 years, factors included the digital agriculture (precision agriculture/big data), environment; research and development; agricultural technology; engineering and mechanization; international agriculture; marketing; management; organic foods, and sales were

very influential to agriculture now and in the future. In comparison, the areas of education and training and communication were only identified as influential. This finding is in direct alignment with Goecker et al. (2015), Newman (2018), and Mercier (2015), who indicated employment opportunities across these and related areas in the agricultural industry would impact the food, agriculture, renewable natural resources, and environmental sectors.

A number of recommendations are offered in preparing land-grant college students for success in the agricultural workforce. Curriculum and academic programs could be revised to include a variety of experiential learning opportunities that are embedded that will allow students first-hand experiences in different agrarian settings. Experiential learning opportunities are especially important for students in agriculture, with no direct agricultural background, before they enter the university. Given the emergence of agtech, including big data digital agriculture (precision agriculture or big data), coursework, curriculum, and experiential learning opportunities should be used to better-prepare graduates to provide leadership and innovation in this fast-growing space. With the ever-increasing and interconnected nature of the global agricultural industry, the importance of an international component in the agricultural curricula could be amplified to provide students experiences to participate in study abroad opportunities. To better prepare graduates for overall career success, land-grant college administrators and faculty could consider the growth areas cited in this study as curricula are revised to stay current with the ever-evolving agricultural industry trends.

A variety of life experiences are necessary concerning career success for land-grant college graduates based on the findings of this study. Many trends will continue to influence the agricultural industry over the next five to 10 years. With factors such as technological advancement in agriculture and biomaterials, global market shifts in population, income, food, and energy, changing consumer preferences for food and biomaterials, and lastly public policy choices, it will become highly imperative and incumbent that professionals with some related experience or orientation to the field are placed in positions of leadership, and have the ability to vision forward while also being agile change agents, thus fostering a dynamic future for the global agricultural industry. It is suggested that land grant-colleges are mindful of these trends given the previously cited factors. A final recommendation includes land-grant colleges to create and revise existing academic programs that will address these trends to prepare society and industry-ready agricultural professionals and graduates, who will serve as leaders and innovators throughout their professional careers.

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