Research Poster

Aligning Industry Certification and Industry-Specific Skills: A Delphi Study Determining the Skills Needed for Entry-level Positions in Animal Science

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Introduction

A foundational relationship exists between workforce readiness, commercial industry, and public education (McNamara, 2009). Deficiencies in the number of graduating students who have the knowledge and skills required by industry are leading to a skills gap across the country (Whittaker & Williams, 2016). In efforts to improve students' college and career readiness, governing agencies in education have created higher academic thresholds. The use of standardized testing is one such example. Dalal and Gunderman (2011) suggested that while student preparation for standardized testing reinforces a foundation of academic knowledge, other student learning outcomes, such as skill capacity, are often ignored. Proponents of Career and Technical Education (CTE) suggested that educational programs designed for students to acquire industry-specific skills for the twenty-first century offer a solution to this problem (Rojewski & Hill, 2017). Many states, including Florida, have created specific secondary school education course pathways and industry certification exams to establish a more concrete link between industry needs and the content that is taught in CTE programs. Students completing a CTE pathway and passing the pathway's exam earn an industry certificate. The goal of industry certification is to produce highly qualified graduates who are career ready for specific entry-level positions. However, research that examines the technical skill-based competencies needed for specific entry-level positions is limited (Fletcher & Tyson, 2017).

Purpose and Framework

The conceptual framework that guided this study is Roberts and Ball's (2009) *content–based model for teaching agriculture*. This model illustrated that competent educators who possess technical knowledge and teach industry-validated curriculum influence the skill acquisition of high school CTE students (Roberts & Ball, 2009; Slusher, Robinson, & Edwards, 2011). There is a clear need to examine the effectiveness of industry certifications to determine if students who have obtained an industry certification, are in fact, proficient in the skills required of entry-level positions within that industry. This research focused on industry needs, and specifically narrowed the scope of the study to animal science industry certification. The objective of the study was to identify the skill-based competencies needed for an entry-level animal science career.

Methods

A modified Delphi technique was employed as the research instrument for this study. A modified Delphi technique can be used to provide a synthesis of insight and knowledge from experienced personnel when distant communication is convenient (Stewart, 2011). The following steps were followed, as recommended by Geist (2010): (1) establish a panel of experts on the topic who are willing to participate, (2) deliver round one of the Delphi where panelists complete an initial question, (3) analyze the responses and build a succeeding questionnaire, (4) deliver round two of the Delphi where panelists complete the succeeding questionnaire, and (5) repeat the third and fourth step until a consensus is reached. Three faculty members in the Department of Animal Science at the University of Florida were asked to provide a list of industry experts that was used as the sampling frame for this study. Sixteen animal science industry experts were identified and asked to complete the research instrument, with nine industry experts agreeing to

participate. It was determined that nine panel members were a sufficient number of participants in the Delphi, as subjects were highly qualified experts and had homogeneous backgrounds (Delbecq, Van de Ven, & Gustafson, 1975). Furthermore, it is recommended that researchers should use the minimally sufficient number of experts that can appropriate represent the pooling of judgments (Delbecq, Van de Ven, & Gustafson, 1975; Ludwig, 1994). E-mail invitations were sent to each panel member for all three rounds throughout the study. A follow-up email was sent to panel members who did not respond in a timely manner in attempt to withstand any substantial dropout rates (Okoli & Pawlowski, 2004). To create the first stage of the Delphi, open-response, email communications were sent to all participants that asked "What are the skills and competencies that an entry-level employee/entrepreneur needs to be able to perform in the animal science industry?" Seventy-three skill competencies were identified and utilized for the corresponding Delphi round. During the second and third round, panel members used a survey created on Qualtrics to assess and rate each skill competency through a five-point, Likert-type scale (*1=unimportant, 2=somewhat unimportant, 3=neither important nor unimportant, 4=somewhat important, 5=important*). Skill competencies that achieved a mean rating of 4.00 or higher were considered to have reached consensus as a necessary entry-level skill for an animal science position (Slusher, Robinson, & Edwards, 2011).

Results

After completion of the modified-Delphi, it was determined that 55 skill statements achieved a consensus of being a necessary entry-level skill. The skill competencies determined the most important were accurately reading a feed label and understanding animal herd movement, fecal patterns, and eating behavior. The ability to effectively administer oral applications, topical application, pour-on insecticide, wormer/worming agents, vaccinations, and antibiotics were also identified as important. Lastly, non-technical skills, such as basic math, reading, and communication skills, were considered to be highly important. Skills that did not achieve consensus as being essential, but were initially identified, include animal age identification, internal parasite knowledge, and administering intravenous, intradermal, and intraperitoneal injections.

Conclusions & Implications

Industry-specific pathways in CTE can strengthen the relationship between workforce readiness, public education, and industry. This relationship is a vital component to the sustainability of CTE programs. Results of this study identified skill competencies deemed essential in entry-level animal science careers. CTE programs that offer animal science career pathways should give special attention to these skills, modifying curriculum taught in animal science pathway courses if necessary. Furthermore, non-technical skills, such as basic math, reading, and communication skills, were identified as being highly important. Integrating math, reading, and communication into contextual applications in animal science courses may strengthen these general workplace skills. Lastly, as the capstone of many CTE pathway programs, industry certification aims to distinguish students who will be proficient in the workplace. The criteria to achieve industry certification should align with industry needs in order for industry certification to be effective. Phase two of this larger study will seek to determine if students who have completed industry certification in animal science can perform skills identified in this Delphi, and therefore bridging the gap between knowledge and practice.

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