Research

Confidence levels of entry year, Texas, school-based Agriculture, Food, and Natural Resource teachers to instruct agricultural mechanics skills

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Introduction

Agriculture, food, and natural resources (AFNR) programs teach students through three interdependent components that include classroom and laboratory instruction, leadership and personal growth (FFA), and supervised agricultural experiences (SAE) (National FFA, n.d.). Furthermore, agricultural mechanics is one of the curriculum areas taught in an AFNR program. According to the Texas Education Agency (TEA) (n.d.), the wide range of knowledge and skills for agricultural mechanics courses include: electrical wiring, operating hand and power tools, plumbing, concrete, fencing, cold and hot metal techniques, surveying, power systems, and planning and constructing a project. Saucier and McKim (2011) found that it is crucial for AFNR teachers to be prepared to instruct safely and effectively teach all of the skills related to agricultural mechanics. According to Sorensen, Lambert, and McKim (2014), skilled teachers are crucial to achieving student success; therefore, it is imperative that teachers are prepared properly and participate in professional development opportunities. Additionally, a common problem concerning school-based agriculture education is a large number of teachers leave the profession prematurely (McIntosh, 2017). Blackburn and Robinson (2008) noted that almost half of all novice teachers will change professions during their first seven years of teaching. A review of literature has indicated a variety of research on what agricultural mechanics skills professional development should focus on; however, there is limited research on teacher confidence levels to teach agricultural mechanics curriculum.

Theoretical and Conceptual Framework

Ericsson's Theory of Expertise and Bandura's Theory of Self-efficacy were utilized to guide this study. *Expertise* refers to the characteristics, skills, and knowledge that differentiates experts and those with less experience (Ericsson, Charness, Feltovich, & Hoffman, 2006). The Theory of Expertise focuses on the characteristics of expert performance and mastery knowledge (Ericsson & Charness, 1994). In almost every domain, including agriculture education, methods of effective training and instruction run parallel with relevant knowledge and techniques (Ericson & Charness). In order for expert performance to be accomplished, 10 years of intense, deliberate performance, initial motivation and interest, proper instruction, instructor feedback, and required resources must all be met (Ericsson, Krampe, & Tesch-Romer, 1993). Furthermore, in order to better teach a student, or AFNR teacher to master a skill, it is important to understand the requirements that first must be met. Bandura defines self-efficacy as one's beliefs in their own ability to execute a task which impacts an individual's decisions, actions, reactions to complications, as well as their overall level of success (Bandura, 1986). According to Ross, Cousins, and Gadalla (1996), teacher efficacy encompasses an individual teacher's expectation that he, or she, will be able to convey student learning. Through experiences, teachers are better able to develop a stable belief about their own abilities (Ross, 1998) – thus improving confidence. Moreover, teachers who are satisfied that they are successfully teaching their students appear to stay in the profession longer (Blackburn & Robinson, 2008). Furthermore, ones confidence in their own abilities is extremely important when teaching students how to perform tasks that could be potentially dangerous to themselves as well as others (McKim & Saucier, 2013). McKim and Saucier (2013) further noted that professional development can

provide teachers with experiences and information that could in return improve one's self-efficacy in regards to teaching specific curriculum and skills.

Methods

The purpose of this quantitative census was to determine the confidence levels of entry year, Texas, school-based AFNR teachers regarding the instruction of agricultural mechanics related skills and to determine their personal, professional, and program demographics. The following research objectives guided this study: (1) Determine the confidence levels of entry year, Texas, school-based, AFNR teachers regarding the instruction of agricultural mechanics related skills and (2) Determine entry year, Texas, school-based, AFNR teachers personal, professional, and program demographics. The population for this study were all entry year, Texas, school-based, AFNR teachers who attended a three-hour new teacher meeting at the 2018 Texas AFNR teacher professional development conference. Based upon a review of literature, a paper questionnaire was developed, reviewed by a panel of experts (N = 5), and subsequently revised. A pilot test (N = 19) was then conducted with a similar population which resulted in a reliability estimate of .96 for the confidence scale (Cronbach's alpha coefficient). Usable data was collected from 143 teachers for a 92.26% response rate. Based upon the research objectives, data was analyzed using IBM SPSS Statistics 22.

Results

Respondents indicated that they had moderate confidence levels in teaching the following top three Texas agricultural mechanics curriculum skill areas: *Handtools* (M = 3.12; SD = 1.05), *Employability/Career Skills* (M = 3.12; SD = 1.10), and *Handheld Powertools* (M = 2.82; SD = 1.18). Additionally, teachers indicated that the bottom three agricultural mechanics curriculum skill areas that they had little confidence in teaching were: *Pneumatics* (M = 0.89; SD = 1.26), *Hydraulics* (M = 1.06; SD = 1.28), and *Modern Machinery Technology* (M = 1.11; SD = 1.29). Results were analyzed using the following scale: No confidence = 0.00 – 0.50, Little Confidence = 0.51 – 1.50, Some Confidence = 1.51 – 2.50, Moderate Confidence = 2.51 – 3.50, and High Confidence = 3.51 – 4.00.

Entry year, Texas, school-based, AFNR teachers indicated that they were mostly female (n = 91; 63.6%), had an average age of 26 (M = 26.23; SD = 7.55), of white ethnicity (n = 120; 83.9%), unmarried (n = 87; 60.8%), who completed a Bachelor's degree (n = 126; 88.1%), and who completed a traditional teacher certification program (n = 96; 67.1%). These teachers teach in a rural community (n = 83; 58.0%), work in a two-teacher program (n = 54; 37.8%), completed 9 hours of agricultural mechanics coursework in college (M = 9.40; SD = 9.98), and completed a high school agricultural mechanics course as a student (n = 76; 53.1%).

Conclusions, Implications, & Recommendations

Entry-year AFNR teachers had the highest (moderate) confidence in teaching basic agricultural mechanics curriculum skills and the least (little) confidence in teaching highly technical skills within the curriculum. Numerous implicative questions arose from these results that include: Why do respondents lack confidence in teaching various agricultural mechanics skill areas? Were respondents taught the highly technical skills, found in the agricultural mechanics skill areas, in which they have little confidence in teaching? What efforts could increase teacher confidence levels? These results and others are grounds for more in-depth

research in this area. Additionally, teacher educators and professional development providers should considering increasing education to remediate these results.

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