Research

Injuries and Other Accidents Sustained In An Agricultural Mechanics Laboratory by Iowa Secondary Agricultural Education Students

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Introduction

Agricultural mechanics courses have been popular in secondary agricultural education programs for many years and continue to be (Burris, Robinson, & Terry, 2005). One of the reasons that agricultural mechanics draws so much interest is the substantive amount of time spent in an agricultural mechanics laboratory learning hands-on skills (Hubert, Ullrich, Lindner, & Murphy, 2003). The incorporation of laboratory-based experiences allows opportunities for students to engage in scientific inquiry and Science, Technology, Engineering, and Math (STEM) based projects (McKim & Saucier, 2013). By incorporating laboratory-based experiences for students, teachers must become more attentive to student safety concerns.

Agricultural mechanics laboratories are inherently a dangerous learning laboratory because of the age and experience level of the learners being introduced to the operation of power mechanics machinery (Dyer & Andreasen, 1999; Shultz, Perry, Byrd, & Anderson, 2012). The agricultural educators' most important role in agricultural mechanics instruction is to ensure that student safety is a top priority (Dyer & Andreasen). The purpose of this study was to identify the injuries and accidents sustained by secondary students within an agricultural mechanics laboratory in the state of Iowa in 2014.

Theoretical Framework

The theoretical framework that guided this study was the disaster theory (Downer, 2010). Furthermore, Turner (1978) found that a series of man-made disasters presented warning signs, that if acted upon, could have been averted. Turner's findings suggest that social implications superceeded engineering problems, thus indicating that disasters could have been avoided. Since students tend to live in a risk-taking world with disregard to rules, they are more apt not to know and understand the consequences of unsafe behaviors (Hubert et al., 2003), and will inevitably incur minor injuries in an agricultural mechanics laboratory.

Methodology

The research objectives for this study were: (1) Determine selected personal, professional, and program demographic characteristics of Iowa secondary agricultural education teachers who instruct in and manage agricultural mechanics programs; (2) Determine the frequency of student injuries as reported by Iowa Agricultural Education teachers, and (3) Determine the source of medical attention provided to the students who were injured. The data collection instrument developed by Johnson, Schumacher, and Stewart (1990), modified by Saucier, Terry, & Schumacher. (2009) and further modified by the researchers was used for data collection in this study. A three-section instrument was utilized in the overall study, the second and third section was used to address the research questions of this study. The first section of the instrument consisted of a 70 statements with double-matrix response scales. The double-matrix required subjects to respond to each statement twice. The second section of the instrument was used to identify personal, professional, and program characteristics of the respondents and the agricultural education programs in which they taught. The third section of the instrument was used to collect the types of injuries, the frequency of injuries and the medical attention rendered. Dillman's (2007) electronic data collection protocol was followed for this study. After five

points of contact, a response rate of 49% (n = 72) was obtained. Non-response error was a relevant concern; therefore, procedures for handling non-respondents as outlined as Method 1 in Lindner, Murphy, and Briers (2001) were followed.

Results/Findings

Results indicated that the teachers spent on average 7.48 hours per week supervising students in the agricultural mechanics laboratory, the average class size was 13 students, the average size of the laboratory was 2403 ft², and the average age of these facilties was 36 years. 82% of respondents have received first aid training. Additionally, respondents indicated that in their career, they encountered the following types of student injuires: 45.8% lacerations, 42.7% burns, 28.1% abrasions, 11.5% eye injuries, 14.6% slips/trips/falls, 1% muscle sprains/strains, 2.1% crushed appendages, 1% severed appendages, and no hearing injuries or broken bones. The most commonly occuring injury in the agricultural mechanics laboratory were lacerations (n = 40), closely followed by burns (n = 38) as reported in Table 1.

Table 1
Frequency of Student Injuries as reported by Iowa Agricultural Education Teachers (N = 66)

Type(s) of injury	1-5	6-10	11-15	16+
Lacerations	31	3	3	3
Abrasions	21	3	0	1
Eye Injuries	11	0	0	0
Burns	33	3	0	2
Muscle Sprain	1	0	0	0
Crushed Appendages	1	0	0	0
Severed Appendages	1	0	0	0
Spils/Trips/Falls	12	2	0	0

Conclusions/ Implications/Recommendations/Impact on Profession

The 66 agricultural education teachers reported on average less than two minor student injuries that did not require the students to leave the school for medical attention over the course of their teaching careers. Only three major injuries requiring medical attention were reported. The low number of major injuries reported per teacher indicated that the teachers are putting student safety as a top priority, which is supported by the findings of Shultz, Anderson, Shultz, and Paulsen, (2014) that safety is the most important topic taught in agricultural mechanics. There were eleven eye injuries reported, this leads the researchers to question if those injuries could have been avoidable by wearing safety glasses. This could align to the suggestions of the disaster theory (Downer, 2010) that those injuries could have been avoidable. The researchers recommend that agricultural education teachers should continue to model and enforce safe work habits. The agricultural education teacher administered some level of medical attention for 110 of the 117 accidents, which further indicates the importance in assuring the teachers should be prepared to administer first aid. The researchers recommend that teachers receive up-to-date training administered annually at the state teachers' association meetings.

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