Research

A comparison of the safety education exposure levels of students participating in the 2003 versus the 2013 Houston Livestock Show and Rodeo Agricultural Mechanics Project Show: Are students more safe 10 years later?

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Introduction/ Conceptual Framework

In the U.S., agricultural education has historically been focused using a three-circle model with the three various components working together (National FFA Organization, 2014). These three components consist of classroom/ laboratory instruction, the FFA, and Supervised Agricultural Experience projects (SAE). School-based agricultural education programs offer many unique hands-on opportunities for students, not only in the agricultural industry, but also in academia and life (Hubert, Ullrich, Lindner, & Murphy, 2003).

Agricultural mechanics classes continue to be one of the most popular curriculum choices for agriculture students today (Hubert & Leising, 2000; Perry, Williams, & Anderson, 2012). When school administrators and teachers commence a laboratory learning experience with their students, they assume the responsibility of providing an accident free environment for the learner (Gliem & Miller, 1993). Of all the tasks and duties of an agricultural science teacher, student safety while working in an agricultural education laboratory is the most important task (Dyer & Andreasen, 1999). Mahon (1975) found that the primary responsibility for providing student safety instruction and a safe learning environment rests with the teacher. Numerous studies concerning safety in agricultural education laboratories have found that these environments can have potential safety hazards relating to noise (Miller & Schimpp, 1993), ventilation (Madou-Bangurah, 1978), and student and teacher attitudes regarding safety (Laird & Kahler, 1995; Lawver & Fraze, 1995). Additionally, students may be exposed to many different tools and materials, some of which are potentially hazardous to their health or could cause serious injury — including death (Johnson & Fletcher, 1990). These laboratories can become dangerous if students are not required to adhere to certain safety guidelines and procedures. With adequate safety education in place, laboratories are an essential venue for learning industry-related skills and gain work experience (Daclan, 2013).

In a recent study by Shultz, Anderson, Shultz, and Paulsen (2014), researchers found that Iowa agriculture teachers perceived safety in the agricultural mechanics classroom/laboratory as being of upmost importance; hence, out of 54 agricultural mechanics competencies that teachers identified as important, seven of those were safety related. In 2012, Perry, Williams, and Anderson, found that 15.4% of Texas agricultural science teachers reported that they do not require students to wear safety glasses or proper personal protection equipment (PPE) while working in the laboratory during hazardous conditions. Another safety study conducted in 1999 by Gerlovich, Whitsett, Lee, and Parsa found that 59% of teachers in Wisconsin had never received any type of safety training and only 14% of the teachers surveyed knew the purpose of Material Safety Data Sheets. As educators, our role in safe laboratory instruction is paramount as the popularity of agricultural mechanics courses increase in public schools.

Furthermore, in teacher preparation programs across the U.S., the instruction of the curriculum area of agricultural mechanics is a critical component in the preparation of new teachers for classroom/laboratory instruction. (Burris & Robinson, 2005). Based upon a review of literature, a conceptual framework based upon the need for safety education in agricultural education laboratories was found and still present to this day.

Methodology

The purpose of this non-experimental, quantitative census was to understand the extent of safety education provided to the 2013 Houston Livestock Show and Rodeo Agricultural Mechanics Project Show participants(HLSRAMPS; *N* = 632), by their respective agriculture teachers and compare those results to data collected in 2003 by Ullrich, Pavelock, Muller, & Harrell (2005). Additionally, injury intensity and demographic characteristics of the participants were also explored. The instrument was judged to be valid (face and content) by a panel of experts (*N* = 5). Data was collected via a booklet style survey that contained two sections (demographic information and questions concerning safety education). Within the safety education section of the instrument, age specific questions were offered to the respondents. Because the instrument was merely collecting demographic information about the participants, reliability of the instrument was of minimal concern to the researchers. Surveys were individually delivered to each student at each project during the 2013 HLSRAMPS. A response rate of 100% was achieved from all participants. Data was analyzed using IBM SPSS 22.0 and frequency and percentages were reported.

Results

Analysis revealed that students had more positive levels of safety education exposure in Texas agriculture classrooms in 2013 than in 2003. The top three increases in student exposure to safety education were in the following categories: *hearing protection was required when working in the agricultural mechanics laboratory* (Δ *n* = 325; 46.64%), *teacher conducted tool safety demonstrations* (Δ *n* = 321; 39.64%), and *eye protection was required when working in the agricultural mechanics laboratory* (Δ *n* = 313; 36.90%). The top three decreases in student exposure to safety education were in the following categories: *CPR instruction* (Δ *n* = -191; -51.04%), *green house safety* (Δ *n* = -154, -44.30%), and *student safety exams are kept on file at school* (Δ *n* = 13; -21.64%). Overall, students received more safety education exposure in 11 of 18 competencies as measured by the instrument.

Conclusions/Implications/Recommendations

Based upon the 18 measureable competencies in the survey instrument, the majority of participants in the 2013 study received more safety education exposure than students in 2003. However, the majority of students surveyed did not receive CPR instruction by their agriculture teacher. Additionally, the majority of students did not witness nor receive injuries in the agricultural education laboratory that required on or off campus medical treatment. Implicative questions arose from the results of this study that include: (1) Are agricultural science teachers certified in CPR? (2) If yes, then why do they not instruct CPR to their students? (3) Should teacher education programs require that all new teachers be CPR certified? (4) Based upon the large number of students who were injured in agricultural education programs, should these laboratories be inspected for safety? These questions and others are grounds for future research in the area of agricultural laboratory safety. Based on the results of this study, the researchers recommend that all agricultural education laboratories be investigated to ensure that a safe learning environment is established for all students. Additionally, professional development programs should be established for all agriculture teachers who supervise student work in agricultural education laboratories — especially CPR training.

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