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Utilizing an Evidence Based Safety Curriculum: A review of Factors that may Influence Effectiveness

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ABSTRACT. ***With a national estimate of 121,252 injuries from 2001-2014, youth who live on, work on, or visit farms in the United States have been identified as a special population at high risk for non-fatal and fatal injuries (National Institute for Occupational Safety and Health [NIOSH], 2014). The purpose of this study was to determine the effectiveness of utilizing an evidence based, "Train the Teacher" approach to increase the safety knowledge and awareness of secondary students. During the 2017-2018 academic year, a representative convenience sample of students whose educators participated in Montana and South Dakota training was sought for this study. Overall, most students (60.2%) identified as male and half (52.1%) were enrolled as a 9th grader. The average student age was 15.4 (SD = 1.3). There was a significant difference (t(116) = 5.67, p < .001) between pre- and posttest.. There was a significant association between students' age category and passing the pre-test ($\chi^2(1) = 10.1$, $p = .001$, $\phi = .315$). There was no significant association between students' age category and passing the post-test ($\chi^2(1) = 0.74$, $p = .390$). Upper-class students of mid-career teachers were significantly more likely to have a passing score on the post-test than under-class students ($\chi^2(1) = 3.914$, $p = .048$, $\phi = .388$). Recommendations include targeting less experience teachers with targeted professional development. Training programs should be designed to provide a coherent strategy targeting influential factors at the organizational and individual level.***

Keywords. Tractors, Safety, Workers, Youth,

Introduction

In 2001, Marlenga, Pickett, and Berg reported a total of 2,389 jobs were performed by 1,138 children from 498 farms. The leading categories of work performed by these youth were animal care, crop management, and tractor with implement operation (Marlenga et al., 2001). Research has shown that most injuries occur to males between 10-15 years old (Hendricks, Layne, & Goldcamp, 2012). Youth that are working in agriculture are susceptible to agricultural hazards (Hard & Myers, 2006). Prevention strategies that integrate established safety training curriculum and student leadership organizations, such as the National FFA, have been recommended to reduce these childhood agricultural injuries (Jepsen, 2012; Myers, 2002; National FFA, 2014; NIOSH, 2014; Sanderson, Dukeshire, Rangel, & Garbes, 2010). School-based agricultural teachers are

uniquely poised to address the critical issue of agricultural youth safety by disseminating effective safety education curriculum to secondary students. However, school-based agricultural teachers have often expressed professional development needs related to safety education (McKim & Saucier, 2011; Saucier, Vincent, & Anderson, 2014; Shultz, Anderson, Shultz, & Paulsen, 2014).

Professional development training has been shown to be an effective means of increasing teacher self-efficacy and competence (Overbaugh & Lu, 2008; Tschannen-Moran & McMaster, 2009; McKim & Velez, 2017). This may create improved teaching quality (Chandrashekar, Nanditha, & Geetha, 2017). Professional development varies widely and supporting research of the effectiveness is inconsistent (Guskey, 2003). Other research (Ingvarson, Meiers, & Beavis, 2005) suggests that professional development is most effective at improving teacher and student efficacy when structured in an active learning environment, experiential in nature, and intricately tied to the problems and skills students most commonly face. Regardless of approach, professional development should focus on closing the presumed linkages between professional learning strategies and student outcomes (Ingvarson et al., 2005), especially those in safety education.

When teachers articipate through active engagement development to internalize new ways of thinking (Swan, Pead, Doorman, & Mooldijk, 2013), professional development has the potential to alter teachers' knowledge and thinking, which in turn can alter practice thereby ultimately improve students' learning of safety (Kennedy, 2016). Interactive experiential learning approaches have been mentioned among the essential elements to improving student learning, specifically to the safety and health discipline (Torres, 2007). Students that appear to have favorable safety attitudes often report fewer injuries and serious incidents (Lawver & Fraze, 1995). Favorable student attitudes and increases in student learning have been reported to be associated with positive teacher attitude (Mensah, Okyere, & Kuranchie, 2013). Therefore, to reduce injuries and improve safety awareness attitudes of students, teachers should focus on educating students on ways to apply their theoretical safety processes through incorporation of experiential learning (Jin & Nakayama, 2013).

This study utilizes experiential learning to conceptualize the linkages among student and teacher attitude, learning, and experience (Jin & Nakayama, 2013; Kennedy, 2016; Torres, 2007). Kolb's (1984) experiential learning theory (ELT) stated, "Learning is the process whereby knowledge is created through the transformation of experience." Several key theorists (Dewey, 1934, 1938, 1958; James, 1890; Rogers, 1961) have built upon the ELT working definition of learning as the "process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38). The experiences are characterized as occurring in a cyclical fashion (Figure 1) as students engage in concrete experiences (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE) (Kolb, 1984). Kolb (1984) focused on experiential instruction being characterized as a continuous learning process, a process requiring the resolution of conflicts, a holistic process of adapting, and that learning involves transactions between the person and environment that creates knowledge. ELT focuses on two modes of grasping experiences that focus on CE and AC. In addition, two modes of transforming experiences focus on RO and AE (Kolb, 1984).

Similar to the foundation of Kolb's (1984) ELT, inquiry-based learning can be defined as a process of discovering new causal relations, with learners formulating hypotheses and testing them though experiments and/or observations (Pedaste, Mäeots, Leijen, & Sarapuu, 2012). Inquiry-based learning served as a conceptual framework for the professional development experience described in this study due to its emphasis on active participation and the learner's responsibility for discovering new knowledge (de Jong & van Joolingen, 1998). Although inquiry-based learning models may vary slightly from one to another, Pedaste et al.'s (2015) review of descriptions and definitions of inquiry phases led to a new inquiry-based learning framework that included five general inquiry phases: *Orientation*, *Conceptualization*, *Investigation*, *Conclusion*, and *Discussion*. *Orientation* focuses on stimulating interest and curiosity and culminates with a problem statement. The problem statement is then operationalized into either a specific, investigable research question or hypothesis during *Conceptualization*. The *Investigation* phase is characterized by curiosity turning into action in an attempt to respond to the stated research questions or hypotheses. Based on the learner's experiences and collected data, final conclusions are drawn in the *Conclusion* phase and set the foundation of communication and reflection that occur during *Discussion* (Pedaste et al., 2015).

Purpose/Objectives

Education research has several strong theories for student learning but lacks well-developed ideas on how teachers learn or how to help teachers incorporate new ideas into practice that ultimately influence student outcomes (Kennedy, 2016). The purpose of this study was to determine the effectiveness of utilizing an evidence based "Train the Trainer" approach to increase the safety knowledge and awareness of secondary students. The study was part of a larger project tasked with developing and evaluating an agricultural machinery safety curriculum through teacher trainings utilizing inquiry-based activities (Pate, Lawver, Smalley, Perry, Stallones & Shultz, 2019), This information could help contribute to current research exploring effective professional development strategies that affect student learning as outlined in the 2016-2020

American Association of Agricultural Education's (AAAE) National Research Agenda Priority 4: Meaningful, Engaged Learning in All Environments (Edgar, Retallick, & Jones, 2016). This study's research objectives included:

- Describe selected demographic characteristics of school-based agricultural education students whose teachers participated in an agricultural safety professional development.
- Determine the effect of a train the trainer agricultural safety education professional development program on school-based agricultural education students' knowledge of tractor and machinery safe operation.
- Explore potential associations among selected demographic characteristics and changes in students' knowledge of safe tractor and machinery operation.

Methods/Procedures

Teacher Participation and Training

School-based agricultural teachers were recruited from Montana and South Dakota to participate in a 10-hour summer teacher training workshop. Teachers were asked to register for the workshop on a voluntary basis and participation was via a "first-come, first-serve" process. To increase participation, incentives were provided to the first 50 registered participants (Dillman, Smyth, & Christian, 2009). Incentives primarily comprised of safety materials and supplies, which included tractor power take-off safety guards, warning labels, personal protective equipment, and supervisor safety toolboxes. Flash drives loaded with workshop curriculum were also provided to participating teachers. Additional incentives included professional development credit towards licensure and safety educational resources for students. The human subject research protocol was reviewed and approved under Utah State University's Institutional Review Board protocol 10514. An Institutional Review Board reliance agreement was established and approved between Montana State University and Iowa State University with Utah State University as the institution of record. Informed consent forms were provided to teachers and subsequently to their respective students. A total of 83 teachers agreed to participate in the training program.

The 10-hour workshop was developed using National Safe Tractor and Machinery Operations Program (NSTMOP) materials and the Safety in Agriculture for Youth Supervised Agricultural Experiences Risk Assessment Resource Guide (Pate et al., 2019). A lesson plan was developed that included two large group activities and rotations between three small groups, inquiry-based activities. During the summer of 2017, the two seminars occurred separately and were hosted at different times. To ensure fidelity of the training, a university teacher educator from each state was trained to present the workshop (Pate et al., 2019). Participating teachers began by completing a large group activity followed by completion of three inquiry-based rotation activities:

1. NIOSH Cost Effective Roll-over Protection Structures (CROPS)
2. Pennsylvania State University's Extension mini-tilt table construction
3. Supervised Agricultural Experience On-Farm Tractor Risk Assessment

After completing the small group rotation modules, teachers were brought back together to conclude the workshop with a final large group activity. During this concluding activity, teachers were asked to incorporate workshop lessons into their existing curricula and have their participating students complete a pretest prior to instruction and a posttest after instructional units were delivered.

Population and Sample

During the 2017-2018 academic year, a representative sample of students whose teachers participated in the Montana and South Dakota trainings was sought for this study. To be included in the study, students needed to be enrolled in a course taught by a participating teacher and be between the ages of 14-18 years old. Students were provided an informed consent/assent form to review with their parent or legal guardian. Students and parents who agreed to participate sent a copy of the signed informed consent/assent forms back to the researchers. A total of 318 students agreed to participate and provided test data, but 200 students submitted incomplete tests or did not meet requirements to be included for the research and were removed from the data set. A total of 118 students (37.1%) provided a complete pre- and posttest and were included in the analysis. The anonymous nature of responses precluded follow-up of absent or non-responding students (Johnson, Edgar, Edgar, Pate, & Steffen, 2015).

Instrumentation

A paper-based instrument was used to collect test results and demographic information from participating students. A pretest of 50 multiple choice and true/false NSTMOP exam questions were randomly generated from the Pennsylvania State

University NSTMOP instructor curriculum resources. The posttest was constructed to be an equivalent from using pretest items with re-ordered questions and answer choices to limit participants' sensitization to the instrument (Ary, Jacobs, Sorensen, & Razavieh, 2010). Additionally, teachers were instructed to wait an interval of one month between administering student pretest and posttests. One point was recorded for each correct answer. Prior to beginning instruction, students completed the written NSTMOP exam to establish knowledge of tractor and machinery operation safety. Instrument items were developed by experts and were evaluated to be content and face valid (Garvey, Murphy, Yoder, & Hilton, 2008). Instrument items are used for student certification nationally and were deemed reliable. The standard minimum passing score for the written NSTMOP exam is 70% or higher. The maximum possible score for the pretest and posttest was 50. Post-hoc reliability analyses for the pretest and posttest yielded alpha coefficients of 0.67 and 0.76, respectively.

Analysis

Test scores and demographic variables were entered into and analyzed through IBM SPSS version 25. Descriptive statistics for participating students' demographics were reported and included frequencies, percentages, means, and standard deviations. Means and standard deviations were reported for participants' tests scores. A matched pairs paired samples *t*-test was used to determine if there was a statistically significant difference between participants' pretest and posttest scores (Gall, Gall, & Borg, 2007). A Chi-square test of association was used to identify association between demographic variables and pass/fail test scores (Leedy & Ormrod, 2019).

Results/Findings

The purpose of objective one was to describe select demographic characteristics of school-based agricultural education students whose teachers participated in an agricultural safety professional development program. Sixty percent (*n = 71*) of students self-identified as male and 51.7% (*n = 61)* were enrolled as a 9-grader. The average student age was 15.4 (*SD* = 1.3) and 16 students did not report their age. A complete detail of participating student demographic characteristics is provided in Table 1.

Table 1. ***Student Demographic Characteristics (n = 118)***

	f	%
Sex		
Male	71	60.2
Female	47	39.8
Grade Level		
9th	61	51.7
10th	18	15.3
11th	15	12.7
12th	24	20.3

Objective two sought to determine the effect of a train the trainer agricultural safety education professional development program on school-based agricultural education students' knowledge of safe tractor and machinery operation. One measure of effectiveness was the evaluation of students' pre- and posttests. The maximum score for pre- and posttests was 50. Students' overall pretest average was 31.8 (*SD* = 5.3) and the overall posttest average was 35.2 (*SD* = 6.2). A matched-pairs paired samples *t*-test was used to determine if test scores differed significantly between pre- and posttest. Students scored significantly higher ($t(116) = 5.67$, $p < .001$) on the posttest. Additionally, pretest and posttest correlations were significant ($p < .01$) and positive ($r = .41$).

Table 2. ***Results of Paired Samples t-Test Test and Mean Difference***

	Overall		
	n	*M* [a]	SD
Pretest Score	118	31.8	5.3
Posttest Score	118	35.2	6.2
Test Difference	118	3.4	6.3

[a] = Mean test difference was calculated by averaging the difference between students' pretest and posttest scores

To provide further context to changes in school-based agricultural education students' knowledge of safe tractor and machinery operation, each NSTMOP test question was analyzed according to content as it pertained to workshop focus. Frequencies and percentages are reported in Table 3, and discussions relating to workshop focus are detailed in later sections.

Table 3. ***Posttest questions most frequently answered incorrectly by students (n = 118)***

Question	*f*	*%*
Loads should only be attached to the following.	78	66.1
a) 3-point hitch		

b) axle c) drawbar d) all of the above		
Government regulation of work hazards and risks is evident at all levels of farm work. a) True b) False	74	62.7
Throttle controls next to the tractor seat increase engine speed when moved: a) rearward and downward b) rearward and upward c) forward or upward d) forward or downward	68	57.6
What percent of tractor-related fatalities are a result from tractor overturns? a) 1% b) 25% c) 50% d) 75%	62	52.5
If a farm owner uses only his/her own labor or only farm labor, the Occupational Safety and Health Act has no jurisdiction in that operation. a) True b) False	61	51.7
According to the North American Guidelines for Children's Agricultural Tasks (NAGCAT), which age group should not operate a medium/large tractor (more than 70hp) a) there is no minimum age b) 12-13 years old c) 14-15 years old d) 16+ years old	59	50.0

The third objective was to explore potential associations among selected demographic characteristics and changes in students' knowledge of safe tractor and machinery operation. Two categories were created for grade levels: under-class (9th-10th grade) and upper-class (11th-12th grade). There were 79 students (66.9%) classified as under-class and 39 students (33.1%) as upper-class. Under-class students averaged 30.7 (*SD* = 5.59) on the pretest and 35.0 (*SD* = 6.76) on the posttest, while upper-class students averaged 34.2 (*SD* = 3.91) and 36.0 (*SD* = 4.73) on the pre- and posttests, respectively. A passing score for NSTMOP test is considered a 70.0% (35 out of 50 questions). An ordinal variable was generated for passing test scores and coded as zero for scores < 70 % and one for scores ≥ 70%. There was no significant association between students' gender and passing the pretest ($\chi^2(1) = 0.82$, $p = .775$) or posttest ($\chi^2(1) = 0.17$, $p = .680$).

An ordinal variable was also generated for age. This variable was coded as zero for ages between 14 and 15 years old and one for ages ≥ 16. For the student age category 14-15 years old, the average pretest score was 30.3 (*SD* = 5.61) and the average posttest score was 35.0 (*SD* = 7.12). For the student age category ≥ 16 years old, the average pretest score was 34.3 (*SD* = 4.1) and the average posttest score was 37.0 (*SD* = 4.62). Table 4 provides a summary of test difference by student age. There was a statistically significant association between students' age category and passing the pretest ($\chi^2(1) = 10.1$, $p = .001$, $\phi = .315$). Students who indicated an age of 16-18 years old were more likely to pass the pretest than students who indicated being 14-15 years old. There was no significant association between students' age category and passing the posttest ($\chi^2(1) = 0.74$, $p = .390$).

Table 4. ***Mean Test Difference by Student Age Category (n = 102)***

	Pretest		Posttest		Test Difference	
Age Category	*M*	*SD*	*M*	*SD*	*M* [a]	*SD*
14-15 (*n* = 61)	30.3	5.61	35.0	7.12	4.9	6.5
≥ 16 (*n* = 41)	34.3	4.1	37.0	4.62	2.0	4.9

[a] = Mean test difference was calculated by averaging the difference between students' pretest and posttest scores

Teachers who participated in the train the trainer workshop had an average of 14.7 years of teaching experience (*SD* = 9.79). This variable was collapsed as ordinal and renamed "Teacher Life Cycle Stage" with 1-5 years of teaching experience classified as a beginning teacher, 6-15 years as mid-career, and 16 or more years as a veteran. Thirty-three (28.0%) students were associated with beginning teachers, *n* = 26 (22.0%) with mid-career teachers, and *n* = 50 (50.0%) with veteran teachers. Using the Chi-square test of association, pretest and posttest scores were compared between under- and upper-class students across teacher life cycle stages. Between under- and upper-class students of beginning teachers, there was no significant differences on pretest ($\chi^2(1) = 0.448$, $p = .503$) or posttest passing scores ($\chi^2(1) = 0.203$, $p = .653$). Between under- and upper-class students of mid-career teachers, there were no significant differences on pretest passing scores ($\chi^2(1) = 3.328$, $p = .068$). However, upper-class students of mid-career teachers were significantly more likely to have a passing score on the posttest than under-class students ($\chi^2(1) = 3.914$, $p = .048$, $\phi = .388$). Upper-class students of veteran teachers were significantly

more likely to have a passing score on the pretest than under-class students ($\chi^2(1) = 5.501$, $p = .019$, $\phi = .305$). Between under- and upper-class students of veteran teachers, there were no significant differences on posttest passing scores ($\chi^2(1) = 0.325$, $p = .569$). Table 5 provides test differences of under- and upper-class students by teacher life cycle category.

Table 5. Students' test difference by teacher life cycle category.

	Beginning		Mid-career		Veterans	
Test Difference	*M* [a]	*SD*	*M*	*SD*	*M*	*SD*
Under-Class Student	1.3	7.0	4.2	5.2	3.6	7.0
Upper-Class Student	5.6	6.8	3.0	4.6	2.6	4.9

[a] = Mean test difference was calculated by averaging the difference between students' pretest and posttest scores

Conclusions/Recommendations/Implications

Recognizing that teachers learn similarly to students (Swan et al., 2013) and that the most effective way of improving teacher and student efficacy is through an experiential based, active learning environment (Ingvarson et al., 2005), the train the trainer professional development program examined in this study delivered curriculum through an inquiry-based approach in an attempt to determine its effectiveness in increasing the safety knowledge and awareness of secondary students. Research has shown that teachers learn similarly to students (Swan et al., 2013) and that the most effective way of improving teacher and student efficacy is through an experiential based, active learning environment (Ingvarson et al., 2005). It is openly acknowledged that student performance cannot be definitively tied to teacher training in this study alone. However, the following discussion can provide insight regarding current connections and future areas of exploration.

The first research objective was to describe selected demographic characteristics of school-based agricultural education students whose teachers participated in an agricultural safety professional development. The typical student participating in our study was a self-identified 9th-grade male. NIOSH injury statistics reported most injuries occur to males between the ages of 10 and 15 years old (Hendricks et al., 2018). Marlenga et al. (2001) reported that male youth were more likely to be assigned to tractors with implement operations and female youth were more often assigned to animal care. To further understand potential impacts, we recommend completing an experimental study to examine causal effects of a train the trainer professional development program among agricultural youth. Specifically, additional research should explore the impact of this training according to gender.

The second research objective sought to determine the effect of the train the trainer program on students' knowledge of safe tractor and machinery operation. The primary measure of effectiveness was the evaluation of students' pre- and posttests. Overall, school-based agricultural education student scores increased from pre- to posttest. The average test scores changed from failing on the pretest to passing on the posttest. However, students' average post-test scores were 70%, which was the cutoff for passing, indicating more work is needed to improve student learning.

Pate et al. (2019) documented one of the most incorrectly answered questions by teachers (f= 54, 49.1%, n = 110) after completing the professional development program was related to rear-rollovers and improper hitching. More than a quarter of the teachers (28.1%, n =110) answered that loads be attached to the three-point hitch Pate et al. (2019). Similarly, the posttest question most incorrectly (f = 78; 66.1%) answered by students of these teachers dealt with rear-rollover tractor hazards due to improper hitching. In this study, more than a third of students (36.4%, f = 43, n = 118) answered that loads be attached to the three-point hitch. Connecting this to Guskey's (2003) review, the enhancement of teachers' content and pedagogical knowledge would help teachers better understand the content that they teach and improve student learning. We concluded that while the topic of side-rollover hazards was discussed in depth during the interactive session involving the mini-tilt table exercise, more targeted curriculum is needed for hitching and backing of equipment. A recommendation is to provide training for an additional round of professional development with teachers that includes an interactive module demonstrating angle of pull and a tractor's center of gravity.

The second most incorrectly answered posttest question (f = 74; 62.7%) dealt with government regulatory enforcement of safety standards. Several government agencies are involved in regulating different aspects of production agriculture (Occupational Safety and Health Administration, Environmental Protection Agency, and Food and Drug Administration). Students' potential lack of work experience, given their age, warrants additional learning activities be developed to improve their understanding of regulatory standards impacting their Supervised Agricultural Experiences (SAE) activities.

The third most incorrectly answered posttest question (f = 68; 57.6%) dealt with tractor controls and their functions. This is likely due to the changes in standardization of tractors controls and color coding prior to 1969. Many older farm tractors are still used in production agriculture. Older tractors lack many standard safety features. Students should be encouraged to

use modern tractors equipped with roll-over protection structures and seat belts, and tractors that have standardized controls for operation. An interactive activity to assist teachers and students in identifying tractor controls and remembering their function is recommended for future workshops with similar participant outcomes.

The third objective was to explore potential associations among selected demographic characteristics and changes in students' knowledge of safe tractor and machinery operation. Students who were 16 years old and older were significantly more likely to pass the pretest, but there was no significant association between student age categories and passing the posttest. We concluded that all students, regardless of age, should complete some form of interactive tractor and machinery safety training. This was evident as pretest average scores for both age categories failed the test. After the training, average posttest scores for both age categories reached the passing mark of 70%. This finding has implications for the Fair Labor Standards Act concerning hazardous occupations in agriculture and young worker age restrictions. We recommend decision makers consider removing the exemption provided for youth between the ages of 14 and 15 years old who have completed specific safety training. Additionally, we recommend increasing the age restriction for hazardous occupations in agriculture to 18 years old in order to be consistent with other industries and students' safety knowledge to perform these tasks. Even when working for a parent or legal guardian, we suspect these youth lack the knowledge and skills to perform these hazardous tasks on the farm. When considering Kolb's (1984) experiential learning model, this group of students has not had enough concrete experience or abstract conceptualization to effectively engage in learning. Kolb characterizes experiential instruction as a continuous learning process, requiring the resolution of conflict, process of adapting, transaction between the person and environment in addition to creating knowledge.

The inclination that experiences of teachers may influence whether a student passes their pre- and posttests relates to Kolb's experiential learning model. Success on the posttest was seen when teaching experience and maturing students were connected. Students that had a beginning teacher were less likely to pass the pretest or posttest. However, upper-class students (11-12 grades) with mid-career teachers were significantly more likely to have a passing score on the posttest. Upper-class students (11-12 grades) with veteran teachers were more likely to have safety training and experiences that contributed to their preexisting safety knowledge. This is evident as upper-class students were significantly more likely to have a passing score on the pretests when working with veteran teachers. Mid-career and veteran teachers could have more exposure to agricultural experiences through professional development or life experiences, which allows them to incorporate personal knowledge into their teaching. Within the literature of teacher professional development, Guskey (2003) revealed the most frequently cited characteristics in the enhancement of teachers' content and pedagogical knowledge was better understanding the content they teach and the ways students learn. In addition, Ingvarson et al. (2005) suggested professional development is most effective at improving teacher and student efficacy when structured in an active learning environment that focuses on the problems and skills students most commonly face. Teachers without a production-based agricultural background may not have had exposure to tractors and/or agricultural safety, which could limit their ability to share relevant experiences. Teacher preparation and continuing education programs need to incorporate more production-based experiences for pre-service and in-service teachers.

Based on the findings and conclusions of this study, future research should focus on the background, experiences, and training teachers have had and the outlets they sought to receive the professional development focused on agricultural safety. Additionally, research should focus on the youth background and the safety measures that are implemented within their SAE. We recognize that an increase in safety knowledge does not equate to performing appropriate safety behaviors. A qualitative field observational study is recommended to be conducted with these students to ascertain the impacts of these training on their performance of safety behaviors.

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