# AN EXAMINATION OF TEXAS AGRICULTURAL EDUCATION SAFETY PROGRAM PROCEDURES

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## Abstract

Agricultural education programs in public schools serve many purposes including educational enrichment, experiences in responsibility, self-motivation and teamwork, as well as instruction in technical agriculture. In these programs students are exposed to safety hazards commonly experienced in agricultural operations. With the overwhelming burden placed on administrators the issue of safety in agriculture programs is largely ignored.

In this study one hundred agricultural education programs in Texas were randomly selected for geographic and school size diversity. Ninety-four of the programs were visited by the investigators, using a researcher developed checklist. The facility inspections and teacher interviews covered twelve different areas concerning the agricultural education safety program. The checklist provide for a consistent basis for focusing on the purpose of the study. The purpose of this study was to evaluate the administration and safety instruction of agricultural education programs within Texas.

The findings are: (1) Of the ninety-four schools surveyed a majority (95.6%) offer agricultural mechanics classes in a shop/laboratory environment. Of the teachers interviewed (78), the investigators found that a majority were male teachers and all had some formal training in safety either in college related courses or from an industry experience. However, only 27.3% of the teachers reported had chemical handling training/certification. (2) Although the majority of the programs relied on the teacher for facility inspections only sixty (78.9%) indicated that accident reports were completed and safety issues documented. Overall, in the area of administrative procedures the majority of the schools surveyed did not have or follow only very basic steps to reduce the likelihood of injury in their facilities. (3) In the area of safety instruction the schools appeared to do much better. Over ninety percent of the programs used safety exams, teacher and student demonstrations and documented safety instruction in lesson plans. A disturbing issue is that only 78.9 percent of the programs required mastery of safety by the students and even fewer utilized other avenues for safety instruction or documented the students efforts in mastery.

With the burden of facility management on the agricultural teacher they must be provided the administrative support to effectively manage and teach safety. In general the teachers fail to develop a total culture of safety and hazard elimination within their programs. These findings and conclusions will guide a future research design in the development of a behavior based safety model for implementation in the agricultural education classroom.

## Introduction

Over the past several years, concerns for the health and safety of student populations in Texas have grown in importance. Many school districts have complicated this issue by demands on improving state-mandated test scores and through Texas policy of local control and site-based management. Violence in public schools has further frustrated the attempts of school administrators to create a healthy and safety environment for students and has further strained resources. These unfortunate events have resulted in less attention being placed on career and technology (vocational-based) programs and in financial neglect of career and technology laboratory facilities in favor of computer labs or other, hi-tech courses that have emphasized test taking skills and in procedures necessary to reduce the chance of catastrophic violence. This is notably consequential in the case of student health in laboratories stocked with dangerous equipment and supplies.

According to the National Institute of Occupational Safety and Health (2000) young people under 20 face a serious risk of death and injury from work-related injuries. Furthermore, the U.S. Department of Health and Human Services (DHHS, 1990) stated that the greatest cause of concern for the health of children and adolescents has become unintentional injuries. The health and welfare of students must be the top priority of educators and administrators (Padham, 1990). Instructors are on the front lines and have the majority of the responsibility for providing a safe and healthy environment. However, administrators are the pacesetters, when it comes to the safety and health of students. Agricultural education teachers typically deliver instruction to students in laboratory settings. While students are seldom injured in school (Baker, 1988), the nature of the laboratory setting increases the chance of injury and exposure to contagions and chemicals.

Developing a positive attitude toward student well being starts with the attitude and practices of the teacher and school administration. Ullrich (1997) recommended that to promote a sense of urgency for safety education, administrators should develop a written safety plan and a detailed documentation system. Additionally, Newcomb, McCracken and Warmbrod (1993) maintained safety instruction is largely a question of personal attitude and instructional practices that impact the affective domain. Addressing Texas agriscience teachers specifically, Lawver and Fraze (1996) recommended more pre-service and in-service education in the areas promoting positive safety attitudes. Teachers are student role models and their actions speak louder and more powerfully than all the handouts or lip service paid to the contrary (Jones, 1987). Student health protection issues are of the utmost importance and teachers and administrators must be committed to achieving a positive safety climate. A school's safety philosophy should commit to providing a safe environment and make it clear that teachers and administrators are responsible for the overall well being of the students when involved with all activities inclusive of the classroom, laboratory, and off campus events. A documented safety philosophy and policy are necessary to demonstrate the commitment to a health environment for students (Padham, 1990).

School district administrators, both on campus and in central offices, have a crucial role in assuring that students and teachers work and learn in an environment that is safe (Carter, 2000.). Administrators of agricultural education programs as well, cannot begin to control risk until they fully understand the nature and extent of potential hazards. They cannot begin to understand those hazards until they have collected and analyzed requisite safety information and selected appropriate forms of

intervention. For a schools, agricultural education, safety program to be effective, it must be based on comprehensive information about the current state of safety, the major impediments to a safe environment, and the identification of resources that can be employed most productively to create a safe school (Rowland, 1999).

In addition to positive role modeling and administrator awareness and support, agricultural educators must consistently include safety instruction in their curriculum. It is essential that students learn the proper methods of performing tasks in potentially dangerous work environments. A good safety attitude by itself will not completely protect the unwary and naï ve. Knowledge of safety precautions, learned safety skills, and the ability to foresee the possibility of injury are all key factors in building a complete safety consciousness (Gempler's, 2001). In the case of educators, they must develop a classroom safety and management system that will prove consistent and supportive in the day-to-day application of safety rules and practices. As with other aspects of classroom management, a consistent and positive approach is key to successful implementation. The implementation of a safety-management program cannot be seen as an inconvenience but rather viewed as the central educational challenge, and one particularly important to the learning process.

Healthy People 2000 (DHHS, 1990) suggested that ages 15 through 24 are a time when young people develop behaviors that may become permanent and that health and safety issues need to be clarified. This situation presents a special challenge for career and technology education programs that are tied to dangerous occupations such as agricultural education is to agriculture. It is well known that agriculture is one of the most dangerous occupation areas (National Safety Council, 1996).

Students desiring employment in a hazardous occupation need proper safety instruction to protect them in both the present and the future work environments. Students in agricultural education programs commonly use equipment and devices, identical to that used in industry. Sullivan (1990) acknowledged vocational teachers are responsible for the safety of their students because of moral obligations and assigned duties for providing a safe environment for their students. It is also understood that preventable and unfortunate injuries occasionally occur in classrooms, laboratories, during field experiences and while managing supervised agricultural experience programs. Consequently, the most important responsibility of the agriculture instructor is to ensure safety of the students (Daniels, 1980)

Research addressing safety standards, safety attitudes and other concerns is presented in countless texts, journals and magazine articles. The majority of on-the-job [as well as school related] injuries are the result of unsafe acts rather than equipment or procedural failures. Safety experts estimate that about 300 unsafe acts occur before a single injury results from this unwanted behavior (Bolender, 1992). When considering agricultural education, safety concerns have been revealed across the country and illuminated most specifically by the following studies: Berkey, 1981 & 1994; Kigin, 1983; Gleim and Hard, 1988; Lawver, 1994; Schlautman and Silletto, 1992; Swan, 1993; and, Hubert, 1996. A Swan (1993) study recommended designating local and federal funds for use in improving safety and emergency equipment and instruction available to instructors and students.

Agricultural Education programs are often comprised of a variety of facility types and emphasis areas. These areas include but are not limited to the following: hot and cold metal work; wood working; paints and preservers; greenhouse and horticultural enterprises; aquaculture; wildlife and

environmental management; animal sciences and management; plant and soil sciences; machinery / engine repair and mechanics; and aspects of construction trades. As such, programs offer a variety of classes, supervised agricultural experience programs [projects], school-to-work offerings and community interactions that apply knowledge and skills from this large variety of emphasis areas. Unfortunately, many administrators assume that because the teacher is certified in Agricultural Education the teachers have the comprehensive knowledge and expertise to monitor all aspects of the program including safety regarding respective equipment and facilities. This misconception may lead to administrator complacency where safety programming is concerned unless a systematic and continuous effort is made to address specific safety and health issues in the various aspects of the program.

In most programs safety topics are covered, albeit in various degrees, within specific lessons for tool or equipment usage or within a unit of instruction (Hubert, Ullrich and Murphy 2000). Interestingly, teachers often overlook the significance of safety instruction and supervision in spite of the litigation potential from incurred personal injuries in the laboratory. As Gliem and Hard (1988) discovered, teachers of agriculture, school administrators, and boards of education were extremely vulnerable to being found negligent and liable if a student were injured in the agriculture shop. In the course of skill development, evidence has suggested students will be more safety conscious if teachers also follow proper safety practices, demonstrate accurate safety knowledge, provide a safe laboratory environment, convey a positive safety attitude, and relay safety expectations to students (Harper, 1984). It must be remembered that the teacher is responsible for promoting desirable attitudes, enforcing consequences to rules violations and monitoring the safety climate (Kigin, 1983). If major portion of laboratory supervision by the teacher should be to emphasize and demonstrate safety and provide feedback on students' safety procedures and provide relevant feedback and reinforcement (Phipps and Osborne, 1988) and a student learns what is practiced (Crunkilton and Krebs, 1982) then unsafe student behaviors put a program at risk.

A well-developed and implemented safety-management program will not only protect students from preventable injuries, and protect teachers, administrators and school boards from charges of negligence but also assist in fostering positive, lifelong safety student attitudes towards safety in their work environments. Attitudes and practices that are developed and modeled for students, and then positively reinforced on a systematic basis are not apt to diminish substantially over time (Rowland, 1999). A proactive thorough safety program grounded in positive teacher attitudes toward protecting students is fundamentally important in laboratory situations involving tools, machinery, animals, plants, chemicals, supplies, and techniques which, if not properly practiced are undeniably more dangerous. Thus safety in agricultural education programs is not to be addressed only in the classroom—it is something that should be modeled, demonstrated, emulated, and practiced continually and created from carefully developed administrative and educational procedures. It is obvious that agricultural education, as well as other career and technology (vocational) programs must improve upon and follow detailed safety/risk management plans to protect student from preventable injury and districts from unnecessary litigation.

## Purpose / Objectives

The purpose of this study was to assess compliance with administrative and safety instruction procedures in agricultural education programs in Texas.

1. Identify and describe selected demographics of the agricultural education teacher and facilities.

2. Identify and describe selected administrative procedures in comprehensive high schools with agricultural education programs.

3. Identify and describe selected safety instruction procedures in comprehensive high schools with agricultural education programs.

## Methods / Procedure

A stratified random sample of 100 Agricultural Education programs in Texas was selected from the Vocational Agriculture Teachers Association of Texas (VATAT) database of Agricultural Education programs. Ten schools were selected from each of the ten VATAT / FFA areas to create geographic randomness. To further randomize the sample according to school district size, two schools from each of the five different University Interscholastic League (UIL) classifications were selected within each area. The division levels for Texas high school competitions are based on enrollments and are divided as follows: 5A (1,780 students or greater), 4A (780-1,779 students), 3A (345-779 students), 2A (160-344 students), and 1A (159 students or fewer) (UIL, 1999).

The researchers developed a booklet type instrument based on a review of the literature and existing instruments. The instrument was developed into 12 sections: Demographics, Administrative Procedures, Safety Instruction, Walking / Working Surfaces, Means of Egress, Fire Protection, Personal Protective Equipment, Tools and Equipment, Welding, Cutting and Brazing, Electrical, Compressed Air Equipment and Environmental Controls. Teacher educators, state agricultural education staff from Texas and Oklahoma, industrial and occupational researchers and agricultural educators served as a panel of experts to review the instrument for face and content validity. Appropriate revisions were completed based on comments.

To carry out the objectives of the study it was determined data was to be collected through direct observation and interviews at each school site. Two schools in a central, geographic location to the researchers were selected for pilot testing the final version of the instrument. By meeting to complete two, onsite assessments, consensus was gained with respect to expectations of each instrument item. Schools' agricultural education teachers, as well as the school administration, were contacted concerning participation in the study. Four researchers personally inspected and reviewed 94 of the selected schools during the spring and summer of 2000. Six sites were unavailable for review. Two sites were being demolished or remodeled and new construction was underway. Two sites did not have laboratory facilities, and two were unavailable due to time conflicts with the researchers.

## Results

Objective one was to identify and describe selected demographics of the agricultural education teachers. Of the 78 teachers interviewed 94.3 percent were male and 5.1 percent were female, 94.6 percent were members of the Vocational Agriculture Teachers Association of Texas. The average time taught was 16.4 years. Nearly 80 percent of the teachers had taken one or more safety related courses

in college. When asked if they had taken any type of safety related training from business or industry sources 39.4 percent had some type of training with the balance responding they had no training from these sources. Finally, 27.3 percent indicated they were chemical handling certified.

Objective one also sought to identify and describe selected demographics of the agricultural education facilities. Of the 94 programs inspected 95.6 percent had agricultural mechanics shops / laboratories, 28.1 percent of which were less than 10 years old, 29.2 percent were 11 – 20 years old and 42.7 percent were 21 years or more. School farms were identified in 41.6 percent of the schools with 26.7 percent being less than 10 years old, 30 percent being 11 – 20 years old and 43.3 percent being more than 21 years old. Greenhouses and horticulture areas were identified in 35.4 percent of the programs with 89.3 percent being less than 10 years old, 3.6 percent being 11 – 20 years old and 7.1 percent being over 21 years old. Barns were identified in 34.4 percent of the programs, with 31.1 percent being under 10 years old, 24.1 percent being 11- 20 years old and 44.8 percent being more than 21 years old. Almost 17 (16.7%) percent of the programs had animal handling facilities with 25 percent being less than 10 years old, 45 percent being 11 – 20 years old and 30 percent being more than 21 years old. Only 2.1 percent had aquaculture laboratory and all were less than 10 years old. A meats technology laboratory was identified in one program and was over 21 years old.

Objective two sought to identify and describe selected administrative procedures teachers utilize in comprehensive high schools with agricultural education programs. Table 1 displays data collected through interviews with agriculture teachers within the selected programs, concerning compliance with administrative procedures. The most commonly utilized administrative procedure was teacher inspection of the facility and equipment for safety problems with 72 (98.6%) of the programs involved. Sixty (78.9%) indicated accident reports were filed and safety concerns are documented. Safety contracts signed by the teacher and student were utilized by 51 (67.1%) of the teachers while 46 (60.5%) also require the parents to sign a safety contract. Insurance agents inspected the facilities and equipment for safety problems in 37 (48.7%) of the facilities. Similarly administrators inspected only 36 (47.4%) of the facilities. A disappointing 14 (18.4%) teachers indicated there was a written safety plan for the Career and Technology program while merely 13 (17.1%) had a written plan for their Agricultural Education program. Thirteen (17.1%) teachers also had a written enforcement or discipline plan for safety violations. To a lesser extent, 11 (14.1%) teachers stated that Material Safety Data Sheets (MSDS) were current and available.

Table 2 illustrates data addressing compliance with administrative procedures. Sixty-one (64.9%) of the facilities had appropriate first aid supplies readily available and in good condition. Cleanup schedules were posted in 17 (1.8%) of the facilities and evacuation procedures were posted in the laboratory and classroom in 14 (14.9%) of the facilities. Posted emergency phone numbers near the telephone were observed in 11 (11.7%) of the facilities.

The third objective sought to identify and describe selected safety instruction procedures in comprehensive high schools with agricultural education programs and is presented in Table 3. The overwhelming majority 74 (97.4%) of the teachers conducted hand and power tool safety demonstrations as part of their curriculum. A nearly identical number, 73 (96.1%), reported that the students were given safety exams. Seventy-two (94.7%) teachers required students to demonstrate hand- and power-tool safety before being allowed full access and use. Seventy (92.1%) teachers

required a safety test prior to allowing students access to the laboratory while 69 (92.0%) documented safety instruction in their lesson plans and 68 (90.7%) kept students safety exams on file. Sixty (78.9%) required students to pass safety exams to 100% mastery level before being allowed access to the laboratory. To a much lesser extent 43 (57.3%) used field trips to emphasize safety in business and industry, while 41 (53.9%) used resource people to emphasize safety and / or first aid. Thirty-seven (48.7%) teachers documented teach-reteach instruction for those students not receiving 100% on the safety exam in their official grade book. Only seven (9.2%) used Computer Based Training (CBT) to emphasize safety and-/-or first aid.

Table 1

School Compliance with Administrative Procedures: Teacher Interviewed

| | Compliance | | |
|---|---|---|---|
| Administrative Procedures | n[a] | f[b] | % |
| Teacher inspects the facility and equipment for safety problems. | 73 | 72 | 98.6 |
| Accident reports are filed and safety concerns are documented. | 76 | 60 | 78.9 |
| Safety contracts signed by the teacher and the student are utilized. | 76 | 51 | 67.1 |
| Safety contracts signed by the teacher, student, and parent(s) are utilized. | 76 | 46 | 60.5 |
| An insurance agent inspects facility and equipment for safety problems. | 76 | 37 | 48.7 |
| Administrator inspects facility and equipment for safety problems. | 76 | 36 | 47.4 |
| There is a written safety plan for the Career and Technology Program. | 76 | 14 | 18.4 |
| There is a written safety plan for your Agricultural Education Program. | 76 | 13 | 17.1 |
| Your Agricultural Education Program has a written enforcement or discipline plan for safety violations. | 76 | 13 | 17.1 |
| Material Safety Data Sheets (MSDS) are current and available. | 78 | 11 | 14.1 |

[a]number responding to item; [b]frequency in compliance with procedure

Table 2

School Compliance with Administrative Procedures: Researcher Observed

| | Compliance | | |
|---|---|---|---|
| Administrative Procedures | n[a] | f[b] | % |
| First aid supplies are readily available and in good condition. | 94 | 61 | 64.9 |
| A student cleanup schedule is posted to help organize facility cleaning. | 94 | 17 | 18.0 |
| Evacuation procedures are posted in the laboratory/shop and classroom. | 94 | 14 | 14.9 |
| Emergency phone numbers are posted near the phone. | 94 | 11 | 11.7 |

[a]number responding to item; [b]frequency in compliance with procedure

Table 3

School Compliance with Safety Instruction: Teacher Actions -

| Safety Instruction | Compliance n[a] | f[b] | % |
|---|---|---|---|
| Teacher conducts hand and power tool safety demonstrations. | 76 | 74 | 97.4 |
| Students are given safety exams. | 76 | 73 | 96.1 |
| Students demonstrate hand and power tool safety before being allowed to use them. | 76 | 72 | 94.7 |
| Safety test[s] given to each student prior to laboratory access. | 76 | 70 | 92.1 |
| Lesson plans document safety instruction. | 75 | 69 | 92.0 |
| Students' safety exams are kept on file. | 75 | 68 | 90.7 |
| Students must pass safety exams to 100% mastery. | 76 | 60 | 78.9 |
| Field trips are used to emphasize safety in business and industry. | 75 | 43 | 57.3 |
| Resource people are utilized to emphasize safety and / or first aid. | 76 | 41 | 53.9 |
| Teaches grade book documents teach / reteach instruction for students not receiving 100% on safety exam. | 76 | 37 | 48.7 |
| Computer Based Training [CBT] is utilized to emphasize safety and / or first aid. | 76 | 7 | 9.2 |

[a]number responding to item; [b]frequency in compliance with procedure.

Table 4 displays data concerning safety instruction and the types of materials provided and presented by the teachers. Seventy-four (97.4%) teachers stated that students were provided and presented materials on tool as well as equipment safety. To a slightly lesser extent, 73 (96.1%), the students were provided and presented materials on electrical safety while 72 (94.7%), were provided and presented material on eye protection and safety. Seventy-one (93.4%) of the teachers provide and present students materials on fire safety. Sixty-three (82.9%) provided and presented students material on animal handling safety while 60 (78.9%) provided and presented material on chemical safety.

To a much lesser degree instruction in biohazard safety was provided by 46 (60.5%) teachers. Students were provided and presented material on greenhouse safety by fewer than half (36, 47.4%) of the teachers. Furthermore, 18 (23.7%) provided students with basic first aid instruction while only three (3.9%) made CPR instruction available.

## Conclusions

Demographic data of the stratified, random sample of Texas agricultural education programs revealed that agricultural education teachers in Texas were largely male and members of the Vocational Agriculture Teachers Association of Texas. While many teacher education programs have discounted and even discontinued instruction in agricultural mechanics, over 95% of secondary teachers work in programs with laboratories in this area. Continuing to under prepare secondary teachers for this important and complex role invites disaster. The agricultural mechanics laboratories, school farms, animal handling and barn facilities were largely older and may need special attention due to

deterioration. It also appears that the numbers of greenhouse and horticultural facilities have increased during the past ten years. These biological laboratory settings bring with them additional requirements for safety instruction in chemical handling and biological containment. Given the importance of the role, it was disappointing to find the secondary education programs surveyed here lacked a focus on safety and safety education and teachers generally did not seek safety related training from business and industry sources.

Table 4

School Compliance with Safety Instruction: Materials Presented

| | Compliance | | |
|---|---|---|---|
| Safety Instruction | n[a] | f[b] | % |
| Students are provided / presented material on tool safety. | 76 | 74 | 97.4 |
| Students are provided / presented material on equipment safety. | 76 | 74 | 97.4 |
| Students are provided / presented material on electrical safety. | 76 | 73 | 96.1 |
| Students are provided / presented material on eye protection / safety. | 76 | 72 | 94.7 |
| Students are provided / presented material on fire safety. | 76 | 71 | 93.4 |
| Students are provided / presented material on animal handling safety. | 76 | 63 | 82.9 |
| Students are provided / presented material on chemical safety. | 76 | 60 | 78.9 |
| Students are provided / presented material on biohazard safety. | 76 | 46 | 60.5 |
| Students are provided / presented material on greenhouse safety. | 76 | 36 | 47.4 |
| Students receive basic first aid instruction. | 76 | 18 | 23.7 |
| Students receive CPR instruction. | 77 | 3 | 3.9 |

[a]number responding to item; [b]frequency in compliance with procedure.

In most cases the responsibility of facility management fell upon the agriculture teachers, with little assistance from administrators to oversee or inspect an organized safety program. Very few of the programs had administrators or insurance agents who inspected the facilities, tools and equipment for safety concerns. The maintenance and monitoring of Material Safety Data Sheets (MSDS) was wholly inadequate.

In many facilities first aid supplies were not available or in poor condition. Basic administrative procedures such as posting a student cleanup schedule, evacuation procedures and emergency telephone numbers were largely ignored in the vast majority of programs.

Teachers do an adequate job of emphasizing the importance of safety by giving safety exams, demonstrating hand and power tool use and expecting students to demonstrate they have the skills to utilize these tools safely. Although most teachers did document safety instruction in lesson plans and kept these exams on file, there remains room for improvement in these areas.

A large number of teachers did not expect 100% mastery on safety exams before granting access to the laboratory. Additionally, it appears there is opportunity to more fully utilize, teaching resources such as field trips and resource people for emphasizing safety issues. Programs also showed

a lack of grade book documentation concerning the re-teaching of safety material in the cases where students do not master the safety exam at the 100% level. There also appears opportunity for teachers to better utilize Computer Based Training (CBT) to emphasize safety.

Teachers can also do a better job when teaching most safety issues but particularly the areas of animal handling, chemical, biohazard and greenhouse safety appears to need more emphasis. Most teachers apparently failed to teach students basic first aid and CPR instruction. It should be noted that teachers could be unqualified or unprepared to deliver these types of training, but they could still utilize the various community and school resources and individuals to help bring these issues more emphasis in their curriculum.

Generally the researchers understood teachers were making a sincere effort to teach basic safety skills but unfortunately concluded that agriculture teachers failed to develop a total culture of safety in their programs. This may be due to the lack of a statewide, systematic procedure addressing the unique issues of safety in agricultural education programs.

## Recommendations and Implications

Positive safety attitudes, beliefs and practices of agricultural science teachers are crucial for insuring students' educational opportunities are not hampered. This study identified and described demographics of teachers and facilities and the administrative and instructional procedures used in these programs.

1. An in-service program to help teachers create localized and personalized agriscience program safety procedures and guidelines should be developed and adopted for use statewide. This in-service program should include sections on safety philosophy, and detailed explanations and examples of thorough agricultural education safety programs. Safety education materials, forms, procedural checklists, etc. should be made available in electronic format so that teachers can edit them to suit their needs. Teachers should be provided with additional time and resources to properly develop and implement suggested procedures.
2. Teacher education programs should renew their commitment to meet the safety education needs of the 95% of secondary agriscience teachers who must lead students in a mechanics laboratory in their daily routine. Competence in the safe operation of agricultural mechanics laboratories remains a necessary component of a teacher education program.
3. As a means of improving teachers' awareness of the importance of developing a proper safety climate in their programs teacher preparation programs should place a much larger emphasis on planning safety programs and curriculum. This will ensure that entry-level teachers understand their role in creating and maintaining a positive safety climate.
4. Workshops should be organized and offered during the Professional Improvement Conference on safety education, curriculum and program development. Addressing these areas may have a positive affect on teacher attitudes and program emphasis on a proper safety culture. Attending will also show proaction in the event of litigation problem.
5. Existing safety materials and curriculum should be reviewed to determine relevance for the great variety of agricultural education programs in Texas. Safety materials and curriculum should be

developed and disseminated throughout the state in paper and electronic formats. Revised and newly developed materials will demonstrate to teachers the importance of safety at the state level.

6. Computer Based Training programs for safety instruction need to be developed and disseminated throughout the state. This can further develop a strong safety philosophy "on three dimensions – the cognitive, motivational, and attitudinal – (students) are believed to reap the benefits (Magney 1990, p. 55). Creswell and Martin (1993) found that computer-based instruction is an effective tool in delivery safety instruction, however it is rarely used as was further demonstrated by this study. This is perhaps due to the lack of teacher competence in using computer-based instructional technologies (Schlautman & Silleto, 1992). Further, teachers should be provided training on the benefits and use of CBT.
7. This and similar studies should be repeated annually throughout the state, as well as other states to continue to document progress and bring much needed attention to safety issues in agricultural education programs.

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