

**Student Demographics, Extracurricular Participation and Safety Education of
Students Participating in the 2003 Houston Livestock Show and Rodeo
Agricultural Mechanics Project Show**

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Abstract

The Houston Livestock Show and Rodeo Agricultural Mechanics Project Show is the largest show of its kind in Texas, and perhaps the largest in the nation. This extracurricular activity provides students and agricultural education programs an opportunity to display skills developed in agricultural mechanics laboratories by exhibiting projects constructed entirely by students. Projects such as gooseneck trailers, bulk feeders, cattle chutes, truck bumpers, and tractor accessories are designed, constructed and exhibited. It is perhaps the most comprehensive opportunity for authentic assessment in agricultural education.

The primary method of data collection for this descriptive study was a survey completed and collected during the 2003 Project Show. Results of the study revealed that an overwhelming percentage of students in the activity were white males. Surprisingly over one-third indicated the FFA was the only extracurricular activity in which they participated. Regarding safety, more than 90% indicated they had taken a safety exam and received instruction in topics such as fire, ear/hearing, tool, chemical, greenhouse, and eye safety. Unfortunately, just over three-fourths had learned about electrical safety, and even lower percentages had received instruction on electrical and equipment safety. More than two out of five students indicated they were not required to wear eye protection in the agricultural mechanics laboratory, and almost four out of five were not required to wear ear/hearing protection.

Introduction

Agricultural education programs offer many unique hands-on opportunities and extracurricular activities to develop both valuable academic and career skills for its students. A large body of research exists that indicates that extracurricular activities improve students self-esteem, self-perception, grades and health, as well as a wide variety of other issues including lowering absenteeism and disciplinary problems (Grafford, 2004). Mahoney and Cairns (1997) looked at the positive connection to school that participating in extracurricular activities created among student whose prior commitment to the school had been marginal. They discovered that a wider choice of activities resulted in a stronger effect because students' individual needs and interests were more likely to be met. Agricultural laboratories provide opportunities for students to engage in scientific inquiry and application through the design, development and presentation of mechanics projects. Experiential learning, or learning by doing, is the foundation of agricultural education (Making a Difference, 2002).

The interrelationship of extracurricular participation and classroom learning is unique to career and technology [vocational education] especially in agricultural education. Laboratories and out-of-school activities available in secondary agricultural education programs are very diverse. Facilities are a mix of classrooms, greenhouses, agricultural mechanics, aquaculture, food processing laboratories, school farms, and off-campus livestock facilities. Extracurricular activities available to students are just as diverse as the facilities. Activities including leadership, communication and personal skills development, judging and livestock showing events and mechanical skills development are widely available.

While preparing students for progression to the university, community college, or careers in the agricultural industry, traditional vocational laboratories of programs are often less than ideal examples of appropriate work environments (Hubert, Ullrich, Lindner & Murphy, 2001). Agricultural laboratories also create the opportunity for students to design and build various projects and offers opportunities for these students to exhibit their projects at organized events. McNeal (1995) indicated that extra curricular participation provide previously marginalized students with access to a more "elite" stratum of the student population and exposes the students to peers who have better attitudes toward school.

Student popularity of traditional laboratory courses, particularly agricultural mechanics, is substantiated as up to two-thirds of teacher course assignments may be spent in these laboratories (Shinn, 1988). Unfortunately, teacher preparation in the area of agricultural mechanics and safety instruction continues to be limited (Hubert, 1996) and this may indicate a weakness in safety preparedness and the creation of a total safety climate within the program. Furthermore, participation in agricultural mechanics project shows in Texas has increased dramatically during the past decade (Harrell & Muller, 2003). Extracurricular activities such as these offer opportunities for students to learn the values of teamwork, individual and group responsibility, physical strength and endurance, competition, diversity, and a sense of culture and community. Lamborn

(1992) and Finn (1993) stated that extracurricular activities provide a channel for reinforcing the lessons learned in the classroom, offering students the opportunity to apply academic skills in a real-world context, and are thus considered part of a well-rounded education.

Theoretical/Conceptual Framework

Over the past decade, concerns for the health and safety of student populations, as well as extracurricular involvement, in Texas have grown in importance. Districts have complicated these two issues by increasing demands on teachers to improve scores on state-mandated tests and through Texas policy of local control of state-based educational funding. These decisions have placed career and technology (vocational-based) programs at the bottom of the importance hierarchy; thus, such programs have endured financial neglect by administrators in favor of computer labs or other hi-tech courses that seem to emphasize test-taking skills (Harrell & Muller, 2003). This is a concern in the case of student health in laboratories stocked with dangerous equipment, as the cause of greatest concern for the health of children and adolescents has become unintentional injuries (U.S. Department of Health and Human Services, 1990.)

According to Dyer and Andreasen (1999), agricultural education laboratories and shops can be hazardous teaching and learning environments. In such laboratories, injuries and mishaps often go unnoticed by the teacher and contribute to inadequate reinforcement of proper student work habits (Hubert, Ullrich, Lindner & Murphy 2001). This may be especially true when teachers and students rush to meet deadlines for entry into various agricultural mechanics project shows.

In such project-oriented courses, Phipps and Osborne (1988) question whether the primary aim of laboratory instruction is skill development or project construction. Too often project completion timetables are set by fair entry deadlines. Project completion takes precedence over skill development progress. If skill development is the focus of laboratory instruction, then thorough attention to all its components, including safety instruction, is essential. These authors further indicate that teachers need to use the laboratory to help students learn and develop efficient work habits and positive attitudes toward working, while also insuring safe laboratory conditions conducive to the growth of each student.

To combat the prospect of student injury in shops or laboratories, a strong safety climate must be instituted in programs. It is recognized that safety is not the most glamorous component of most courses. Safety education is covered, albeit in various degrees, within a lesson for specific tool use or unit of instruction (Hubert, Ullrich and Murphy 2000). Teachers must be aware of what they say and do for they are the ones ultimately responsible for the consequences of their own actions (McCormick, 1994). If teachers fail to promote and follow safety procedures, students may likely follow suit. From this perspective, one must be mindful of the consequences teachers' actions and behaviors have on students' learning and attitudes toward safety.

Adolescents tend to see things in black and white and fail to take into account the perplexities and complexities of the real world (Clark & Starr, 1996). They tend to live in a risk-taking world where ignoring the rules adds to the excitement of the moment. Frequent risk-taking is “normative, healthy, developmental behavior for adolescents” (Ponton, 1997). Agricultural education programs supported with laboratories are designed to present real-world situations to students in safe learning environments. The primary focus of laboratory instruction should be to develop students’ ability to perform the skills needed in real occupational settings (Hubert, Ullrich, Lindner & Murphy, 2001). In the course of skill development, evidence suggests that 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).

Phipps and Osborne (1988) assert that a major portion of laboratory supervision by the teacher is to emphasize and demonstrate safety, provide feedback on students’ safety procedures, and provide relevant feedback and reinforcement for student performance. No teacher wants to be the defendant in a negligence lawsuit brought against his or her district. Teachers of vocational agriculture, school administrators, and boards of education have been found extremely vulnerable to being found negligent and liable if a student were injured in the agriculture shop (Gliem and Hard, 1988). Crunkilton and Krebs (1982) asserted that a person learns what is practiced, whereas McCormick (1994) stressed learning connotes a change of behavior. Unsafe student behaviors put a program at risk. Sullivan (1990) concluded that modeling safe behavior is one of the 16 actions necessary to protect students from injury. Thus, a student injured from an unsafe practice demonstrated by the teacher could result in costly and preventable consequence to the teacher, program, school, and district. We must remember the teacher is responsible for promoting desirable attitudes that assist pupils in developing a proper respect for safety (Kigin, 1983).

Further identification of the less safe practices of teachers is necessary. That is, those teachers who believe safety is important are more willing to adhere to safety laws, policies, and practices, thereby resulting in safer teaching and learning environments, lower student injury rates, and decreased legal liability (Hubert, Ullrich, Lindner & Murphy, 2001). The Houston Livestock Show and Rodeo Agricultural Mechanics Project Show is most likely the single largest authentic assessment activity completed on the basis of actual demonstration of mechanical and presentation skills. Furthermore, issues concerning the development of safety skills and attitudes during project construction are essential to reduce the incidence of future injuries.

The Agricultural Mechanics Project Show held during the Houston Livestock Show and Rodeo has been an integral part of developing the workmanship and mechanical skills of youth in Texas for over 20 years. During the 2002 event nearly 700 projects, ranging from gooseneck trailers to bulk feeders to cattle chutes to truck bumpers and tractor accessories, were displayed by approximately 800 agricultural education youth and constructed by well over 2400 in laboratories dispersed across the state (W. Harrell & J. Muller, personal communications, October 15, 2003). This being the largest single event

of its kind, data concerning participant demographics, extracurricular activities and safety education would be helpful in identifying weaknesses in safety education program.

Purpose and Objectives

This project's purpose was to gather data concerning the participating students and schools that participated in the Houston Livestock Show and Rodeo's Agricultural Mechanics Project Show. The specific objectives were to:

1. determine demographic characteristics of respondents;
2. determine extracurricular activities in which the students participate; and
3. determine the types and extent of safety education received before working on projects.

Procedures

The target population of this study was Texas agricultural education students participating in the 2003 Houston Livestock Show and Rodeo Agricultural Mechanics Project Show. Because this is descriptive research sponsored by the Houston Livestock Show and Rodeo, a questionnaire was developed based upon a series of student and program characteristics and following a review of the literature by the researchers. The instrument consisted of three sections: Demographics, Extracurricular Participation and Personal Health and Safety Training.

A panel of high school agricultural mechanics students and agricultural education teachers reviewed the instrument and identified items to be included, modified or removed to improve for face and content validity. To improve reliability, the instrument was field tested with agricultural science teachers and high school students involved in agricultural education programs during the Area IX, Sam Houston District FFA meeting at Huntsville High School.

Eight hundred surveys were prepared and 650 were distributed during the entry and set-up day of the 2003 Houston Livestock Show and Rodeo Agricultural Mechanics Project Show. Students returned 568 survey or 87.38% of those distributed. A qualifying question was used to eliminate those students whose projects were entered through 4-H programs; thus, 43 surveys were removed. Also, 31 surveys were found to be incomplete and therefore unusable. This allowed for 494 useable surveys and a return rate of 76.15%. Descriptive statistics were tabulated using Microsoft Excel®.

Findings

Objective one was to describe students participating in the 2003 Houston Livestock Show and Rodeo Agricultural Mechanics Project Show. An overwhelming majority (88.06%) of the respondents were males. The average age of the respondents was 16.86 years old and the age and ethnicity distribution is shown in Table 1. It is also obvious when reviewing the data illustrated in Table 2, that Anglo (non-Hispanic) students

comprise the vast majority (93.50%) of the participants with Hispanics being a distant second (4.07%).

Table 1. *Age Distribution of Respondents*

Age in Years	Frequency of Responses
13	19 (3.85%)
14	51 (10.32%)
15	77 (15.59%)
16	194 (39.27%)
17	138 (27.93%)
18	15 (3.04%)

n = 494

Table 2. *Ethnicity Distribution of Respondents*

Ethnicity	Frequency of Responses
Anglo (non-Hispanic)	460 (93.50%)
Hispanic	20 (4.07%)
African American	6 (1.22%)
Other	3 (0.61%)
Native American	2 (0.41%)
More than one ethnicity	1 (0.20%)
Asian	0 (0.00%)

n = 494

Objective two was to describe the extracurricular participation of students involved in the 2003 Houston Livestock Show and Rodeo Agricultural Mechanics Project Show. All 494 respondents were members of the Texas FFA Association. One item of note was that over one-third of the respondents listed FFA as their only extracurricular activity. Table 3 describes the various activities in which the respondents identified as being involved.

Table 3. *Frequency of Respondents Extracurricular Activities*

Activity	Frequency of Responses
FFA	494 (100%)
Football	153 (30.97%)
4-H	102 (20.64%)
Track	102 (20.65%)
Baseball	74 (14.98%)
Basketball	70 (14.17%)
Volleyball	16 (3.23%)
Softball	15 (3.05%)
Tennis	14 (2.83%)
Other various activities	74 (14.98)
Other C&T Clubs	70 (14.17%)
Beta / Honor Society	64 (12.96%)
Band / Choir	33 (6.68%)
Foreign Language Club	24 (4.86%)
Cheerleading / Dance	16 (3.24%)

n = 494

Objective three was to determine the types and extent of safety education received before working on projects, and these results are displayed in Table 4. The vast majority of responding students (96.36%) indicated that they had taken a safety exam and had been presented material on: fire safety (95.55%), CPR instruction (95.14%), ear or hearing safety (94.13%), chemical safety (93.32%), greenhouse safety (91.30%), and eye safety (90.69%). Also, almost 95 percent of students understood that their safety exams were filed at school.

To a lesser degree students were presented material on electrical safety (77.33%), biohazard safety (71.26%) and equipment safety (67.61%). Interesting to note is that over three-fourths of the students were presented material through computers to learn about safety or first aid. Furthermore, a slight majority indicated that they were required to wear safety glasses in the laboratory (57.70%), have received first aid training (53.24%) or had a teacher demonstrate hand and power tool safety (52.43%). Not surprisingly, less than half had a guest speaker present topics concerning safety in class and were presented topics on animal safety. A last item is that just slightly more than 20 percent indicated that they were required to wear ear protection when working in the laboratory.

Table 4. *StudentSafetyInstruction* n = 494

Question	<u>Yes</u>	No	N/A
Have you ever taken a safety exam?	476 (96.36%)	18 (3.64%)	0 (0%)
Were you provided or presented material on <u>fire safety</u> ?	472 (95.55%)	7 (1.42%)	15 (3.04%)
Have you received CPR instruction?	470 (95.14%)	11 (2.23%)	13 (2.63%)
Are your safety exams kept on file at school?	469 (94.94%)	11 (2.23%)	14 (2.83%)
Were you provided or presented material on <u>ear or hearing safety</u> ?	465 (94.13%)	11 (2.23%)	14 (2.83%)
Were you provided or presented material on <u>tool safety</u> ?	461 (93.32%)	15 (3.04%)	18 (3.64%)
Were you provided or presented material on <u>chemical safety</u> ?	461 (93.32%)	17 (3.44%)	16 (3.24%)
Were you provided or presented material on <u>greenhouse safety</u> ?	451(91.30%)	27 (5.47%)	16 (3.24%)
Were you provided or presented material on <u>eye safety</u> ?	448 (90.69%)	29 (5.87%)	17 (3.44%)
Were you provided or presented material on <u>electrical safety</u> ?	382 (77.33%)	81 (16.40%)	31 (6.23%)
Were you provided or presented material on computer to learn about safety or first aid?	379 (76.72%)	91 (18.42%)	24 (4.86%)
Were you provided or presented material on <u>biohazard safety</u> ?	352 (71.26%)	97 (19.64%)	45 (9.11%)
Were you provided or presented material on <u>equipment safety</u> ?	334 (67.61%)	108 (21.86%)	52 (10.53%)
When working in the agricultural mechanics laboratory were you required to wear eye protection?	285 (57.70%)	183 (37.04%)	26 (5.26%)
Have you received first aid instruction?	263 (53.24%)	206 (41.70%)	25 (5.06%)
My teacher has conducted hand and power tool safety demonstrations.	259 (52.43%)	187 (37.85%)	48 (9.72%)
Have you had a guest speaker in class talk to you about safety?	225 (45.55%)	215 (43.52%)	54 (10.93%)
Were you provided or presented material on <u>animal safety</u> ?	223 (45.14%)	221 (44.74%)	50 (10.12%)
When working in the agricultural mechanics laboratory were you required to wear ear protection?	109 (22.06%)	52 (10.53%)	333 (67.41%)

Conclusions

Positive safety climates and active extracurricular programs are essentials for the students to be successful and safe in any school system. Both of these topics are of concern to all agricultural education teachers to ensure the social development, skill improvement and the creation of safety attitudes, beliefs and practices.

One item of great concern to the researchers is the data concerning gender and ethnicity. Few females and students of an ethnicity other than Anglo are represented. Granted, a wide array of research studies illustrate that the ethni issue is not confined to agricultural mechanics participation.

Secondly, it can be inferred from a review of the data that a larger than expected number (175, or 35.43%) of participating students are active in the FFA program only. It might be further assumed that these students are largely involved only in the agricultural mechanics activities sponsored by the Houston Livestock Show and Rodeo and other similar organizations sponsoring project shows.

A vast majority of students are receiving safety education and materials concerning fire, ear and hearing protection, tools, chemicals, greenhouses and eye protection. Two issues of concern are that only three-fourths of the students are receiving instruction concerning electrical safety and equipment safety.

It is odd that a large majority of students are receiving CPR training but only slightly more than one-half receive training on first aid procedures. Is it possible that the term "CPR" confused the students? The researchers cannot explain this seemingly contradictory data and further review is necessary in this area.

Other issues that should be immediately addressed is the data revealing that less than 60 percent of the students were required to wear safety glasses, just over one-half had teachers that conducted tool and equipment demonstrations, and only 22 percent were required to wear hearing protection in the laboratory.

Teachers should use all avenues to address safety issues with their students, including demonstrations, guest speakers and computer aided instruction. None of these avenues were used at acceptable levels.

Recommendations

It is essential that agricultural education teachers involved in this program reflect upon this issue and identify roadblocks to ethnic and female participation. The ethnicity concern certainly expands across agricultural education and the FFA, but the gender issue is less prevalent. Barriers to participation, as well as factors contributing to existing stereotypes, needs further research. Further study of teacher and student attitudes is recommended to identify possible biases.

If FFA agricultural mechanics activities are the only extracurricular activities in which 35.43% of these students are involved, the concept of project shows needs to be broadened and more outlets developed for student exhibits. As Black (2002) stated, students who participate in structured extracurricular activities are likely to have higher academic achievement and higher levels of commitment and attachment to school.

The percentage of students receiving instruction in electrical safety and equipment safety should be much higher and should be immediately addressed by agricultural educators. Anything less than 100% could prove fatal.

Similarly, 100% of the students should be responding that they are required to wear safety glasses and hearing protection in the laboratory. While economics should not be a limiting factor in this matter, national and state agricultural education leaders should develop partnerships with major companies in the safety industry to provide safety materials at little or no cost.

Perhaps the strongest recommendation that can be made is the proposal of a required course focusing solely on shop and laboratory safety in all teacher preparation programs or at the least coordination of required agricultural mechanics/engineering course curriculum to include necessary safety and health issues. The agricultural education profession gives much attention to skill acquisition, and in some cases, requires special certification to teach related courses. Unfortunately, safety often receives only a token mention. The agricultural education program is always only one major laboratory accident away from having its safety instruction questioned and scrutinized.

Additional research in the area of FFA activities is recommended to further assess their impact on student accomplishment and skill acquisition in high school and beyond. It is suggested that research from athletics program be used as a model of research for FFA activities research

Discussion/Implications

The implications that many students only participate in extracurricular agricultural mechanization exhibits creates unique implications. If such a large percentage of students only participate in these types of activities, we must develop other avenues for these students to exhibit their skills and more research needs to further define this area of perceived need.

Other findings of the study identified strengths and possible weaknesses in the safety education of students involved in programs that are widely considered premier or at least very good agricultural mechanics programs. Even though the issues of safety, safety education, facility management and safety problem identification has been a hot topic during the past five years at Professional Development Conferences in Texas, studies such as these still find concerns that need to be addressed.

Safety issues cannot be ignored and the development of a statewide safety development program is essential. If organizers of project shows, agricultural educators and experts from industry stress the importance of safety, continuous and systematic positive change will occur.

From another standpoint the researchers noticed the lack of ethnic and gender diversity in the project shows participants. This issue is of great concern and further effort and research needs to follow.

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