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The Role of Agricultural Mechanics in High School Agricultural Education

Five Essential Subject Areas in Every High School Agricultural Education Course

by Harry N. Boone, Jr.

I teach a three week intensive curriculum development course for our Agricultural and Extension Education student teachers. As they develop a course of instruction (COI) for a high school agricultural education program in West Virginia using the eight concentration areas and nearly forty-five courses, I show them how five subject areas must be included in most if not all of the courses they will include in their COI. We discuss the Total Program Model (The National FFA Organization used the term "Three-Component Model.") (National FFA Organization, n.d.). We discuss how one component of the Model is "leadership" and that every student must receive instruction in "premier leadership, personal growth, and career success" (National FFA Organization, n.d.) through their involvement in FFA activities. The key words in that statement are "every student" and not just FFA members. You may not be able to force every student to be an FFA member, however, you can force every student to participate in leadership development.

The second subject area is supervised agriculture experience program (SAE). The concept of SAEs can be traced back to the origin of high school agricultural education programs. If we are truly implementing the Total Program, every student must have an "experiential, service and/or work-based learning" component (National FFA Organization, n.d.) as a part of their agricultural education class.

If you have students participating in supervised experience programs, then they need to assess their progress in these educational ventures. Therefore record keeping is the third subject area that I require my students include in every course taught. Every student should be required to keep records on their SAE for a number of reasons. First and foremost students need to assess their educational and/or financial progress with their program. A by-product of this recordkeeping is the opportunity to earn advanced degrees and proficiency awards in the FFA.

The fourth area that is required for every course is career exploration. The mission of agricultural education is to prepare "students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources systems" (National FFA Organization, n.d., The Agricultural Education Mission). Therefore instruction in career opportunities, entry requirements for various careers, and basic career skills such as developing a resume, writing a cover letter, and participating in interviews should be included in the agricultural education curriculum.

I would argue that in some form the first four subject areas must be included in every course that is taught in the high school agricultural education curriculum. The fifth area that should be included in most, if not all courses, is agricultural mechanics. With one exception, I can show students how agricultural mechanics fits into all of the nearly forty-five courses approved for high school programs in West Virginia. (The one exception is "leadership development.")

I will provide two examples to make my point. Let's take "greenhouse production and management" for example. Agricultural mechanics areas such as construction of facilities, heating, and plumbing should be included in the curriculum. What about "livestock production?" Once again construction of facilities, fencing, restraint systems, and rope work could be included in the curriculum.

This issue of *The Agricultural Education Magazine* is devoted to the topic "The Role of Agricultural Mechanics in High School Agricultural Education. As you read my introduction to this article there is no doubt about my opinions on the topic. If agricultural education is to survive, we must make certain that the Total Program Model is implemented. If we are to implement the Total Program, five subject areas must be included: leadership, supervised agricultural experience programs, record keeping, careers and agricultural mechanics.

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Dr. Harry N. Boone, Jr., is a Professor at West Virginia University and Editor of ***The Agricultural Education Magazine.***

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E-mail: NAAE@uky.edu

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Editor
Dr. Harry N. Boone, Jr., Professor, Agricultural and Extension Education, West Virginia University, PO Box 6108, 2054 Agricultural Sciences Building, Morgantown, West Virginia 26506, Phone (304) 293-5451, FAX: (304) 293-3752.

E-mail: harry.boone@mail.wvu.edu

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Agricultural Mechanics In Secondary Agricultural Education

by Ryan Anderson

The United States is currently facing one of its largest skilled labor shortages in history, even after a decade long economic recession. During this time span, the unemployment rate reached as high as 10%. There were able-bodied Americans who could not "find" work; yet the need for skilled laborers continued to grow. Somewhere along the way our society lost touch with the need for skilled laborers. Did the American greed of the 1980s facilitate an attitude that everyone should have a white collar job and make more money on Wall Street than we could dream possible? Did we as a profession shoot ourselves in the foot during the 1990s when we claimed everything will be computerized in the next 30 years? Our society has developed an elitist attitude where blue collar jobs are no longer acceptable for our children. I am not sure how this came about, but at some point the idea that every student needed to go to college became engrained into the nation's mind.

What does college and career readiness mean to you? To me, it means every student in secondary education should be developing career readiness skills that are essential to be successful in the real world. We should be introducing them to ideas, concepts, and skills that will add to their knowledge base that leads our students to become productive members of society. I wish more parents and politicians realized that not every student fits the college bound mold. As we teach welding, we should take time to cover the careers associated with welding. We should dive into the careers that go beyond just becoming a welder. The students should know that there is a huge shortage of welders, as well as a shortage in the supporting sectors of welding as well. We should espouse our students to more than the perception of welding as just burning an electrode in a dark and dirty environment for the next forty years. We should encourage the college bound students to consider the engineering side of welding or the management side. We should work with our students who are not college bound and introduce them to the business skills they will need to become successful entrepreneurs. Regardless of whether the students are college bound or not we should expose our students to getting their hands dirty and that getting dirty is ok. Agricultural mechanics is one area that we can help our students develop skills that can lead to immediate employment upon graduation.

While agricultural mechanics is an excellent avenue to teach our students STEM skills and provide the students with real world skills, not everything is coming up roses. Looking at the research conducted in agricultural education you will find there are problems facing agricultural mechanics. Essentially, we have undergraduates who avoid enrolling in agricultural mechanics courses who then become unprepared teachers who inherit overcrowded classes and are expected to teach with insufficient and outdated tools and equipment. This is the perfect recipe to end agricultural mechanics instruction.

What do we need to do as a profession to improve agricultural mechanics instruction? This really appears to be one of those chicken vs. the egg type questions. It starts with you, the agricultural education teacher; regardless of whether you personally like teaching agricultural mechanics or not there are several basic skills that students should learn. I have heard too many undergraduates tell me "I am NEVER going to teach agricultural mechanics." I have to remind them that becoming a teacher is not about what you want, it is about what your students and community need. I also believe it begins with me, the teacher educator. We need to provide you with as many opportunities to learn about agricultural mechanics as possible to ensure you are prepared to teach agricultural mechanics. I also believe it starts with your local alumni. It is their responsibility to help you outfit your facility to teach agricultural mechanics. This does not necessarily mean a financial commitment, it could simply mean volunteering time with you and the agricultural education students to develop the skills necessary to be successful. It may be helpful to set up an advisory council for your program that has subcommittees that focus on each of your content areas. I also think it starts with industry, they can offer educational discounts for

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Dr. Ryan Anderson, the January - February Theme Editor, is an Assistant Professor in the Department of Agricultural Education and Studies at Iowa State University.

The Importance of Agricultural Mechanics in High School Agriculture Education Programs

by Hannah Hilsabeck

I never took an agriculture mechanics course until my senior year of college. As a high school student, I was under the impression that "shop" classes were for those students that weren't "book smart;" they were going to go right into the industry after high school with no post secondary education. I remember being told, that, "agriculture mechanics courses prepare students to enter the work force directly after high school." It took eight and a half years, one agriculture mechanics course of my own, and 16 weeks of student teaching for me to figure out that may have been their role in the past, but with today's technology in our constantly changing industry, it is not really the case.

In my high school we had an agriculture teacher, a woodworking/electric teacher, and a welding/engines teacher. I took every agriculture class that was offered but stayed clear of the shop except to build our homecoming float, because I knew that I wanted to teach agriculture in a program where there was separate shop teacher. I was under the impression that agriculture mechanics courses did not relate to my field of study. I continued this mentality into college and really until I was almost done with my student teaching experience.

The one and only agriculture mechanics course I have taken was Methods of Teaching Agriculture Mechanics at Iowa State University. I grew up on a small farm and my dad owned a construction company, so I had a little background knowledge. I went through the motions in the course because it was a requirement to graduate but in the back of my mind I kept thinking that I wouldn't ever be teaching these courses in my high school classroom.

Throughout college I continually contacted my high school agriculture teacher for advice. When we got our student teaching placement forms, I gave him a call. Now this man impacted my life so much that I decided to become an agriculture teacher myself. I knew he would be able to advise me toward a placement that would push me outside of my comfort zone. We came to the conclusion that my biggest weakness was agriculture mechanics, so to an agriculture mechanics strong program I went. Though I had many reservations about this decision to begin with, looking back I wouldn't have it any other way. During my student teaching experience I taught welding and small engines classes and a unit on woodworking.

> Agricultural mechanics courses expose students to career opportunities and prepare them to enter their next form of training.

I have to begin by saying, my cooperating teacher was amazing. He was so patient and understanding with me knowing that these areas were my weaknesses and that I was there to work specifically on them. He is the main reason my perspective on agriculture mechanics in high school agriculture programs has changed. I thoroughly enjoyed observing him teach in these areas because you could tell he was so passionate about them. This also had an impact on the students in his classes. While I was teaching these classes there were many times he would have to teach me before I could feel comfortable teaching the students. Other times he let me struggle through and figure it out. I also brought in professionals a few times so I could learn right along with the students, which my cooperating teaching highly suggested for new teachers. I also planned a few field trips to expose the students to all the career opportunities in agriculture mechanics. It was a conversation I had with my cooperating teacher after one of the larger field trips that was the turning point in my perspective of agriculture mechanics in high school agriculture education programs.

First, and foremost, agriculture mechanics courses are not just for the students looking to enter the work force directly out of high school. Any student looking to explore different career options should be encouraged to take at least one agriculture mechanics course in high school. Looking back, I wish I would have been pushed a little harder in high school to take a few myself as it would have made the college course less daunting. I may have discovered my love of woodworking 4 years sooner.

I planned an all day field trip to a manufacturing company and community college for the engines and welding class students. At the time I planned the field trip, I thought it

would just be good exposure for the students and hopefully open their minds and doors of opportunities into different career opportunities. We got to walk through every stage of manufacturing farm equipment and talk to employees of the company about their training and job position within the country. On the drive back to the school the students were so excited about what they had seen and learned. That is when I had the epiphany, my goal and intentions were right. One of the purposes of agriculture mechanics courses is to expose students to all the opportunities that are available.

While agriculture mechanics courses do have an important role in preparing students to enter the workforce directly out of high school, that is not as common today. With the depth of mechanics and amount of technology today almost all careers in the area of agriculture mechanics require some type of training program, trade school or associates degree. For example, one of the guest speakers I had in my welding class was a welding instructor from Vermeer. He said no matter what previous training or degree a welder applying at Vermeer has, they are required to go through their welding training program before they can begin working for the company. Therefore a welding class in high school is not preparing the students to begin working at a company like Vermeer directly out of high school, but a student who took welding in high school may be able to move more quickly through their training program and be better prepared than a student who did not take a welding class in high school.

The importance of agriculture mechanics in high school agriculture education programs is huge. Not only can these courses expose them to careers they may not have known existed but they can prepare them to be ahead when entering their next form of training. These courses are important but so are the teachers who will be teaching them. I still think that I will prefer teaching in an agriculture program with a separate agriculture mechanics teacher, more so because I still don't feel confident in my experience in the area. However, if I enter a teaching position where I do have to teach agriculture mechanics, I will call on every resource that I have to give my students the best experience possible so they can reap the benefits of being enrolled in agriculture mechanics.

Hannah Hilsabeck is a 2014 grauduate of the Department of Agricultural Education and Studies at Iowa State University.

Agricultural Mechanics.... ***(continued from page4)***

schools to purchase tools and equipment. I also believe industry can help better prepare teachers through workshops, webinars, and do-it yourself instruction. What I am really trying to say is we do not need to point fingers or worry about the chicken or the egg. We need to take the initiative to ensure young teachers are being prepared to teach agricultural mechanics so our students will get the training that they need to be productive citizens who can help to fill the gap of skilled laborers.

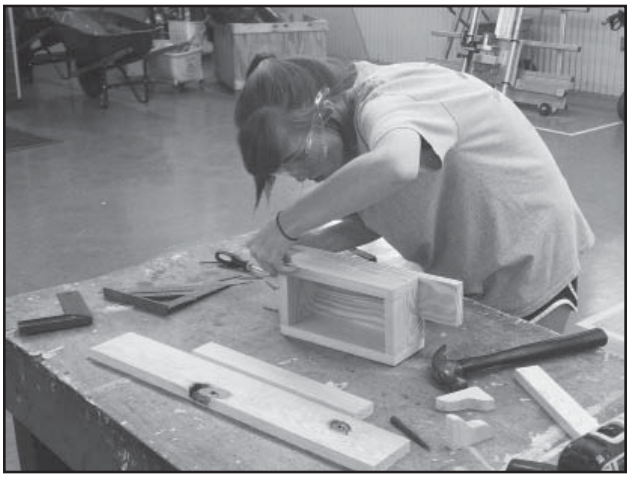
In this issue we will start with Hannah Hilsabeck and Trent Wells as they describe how they developed their passion to teach agricultural mechanics. Both Hannah and Trent are former students of mine. I would love to take credit for their passion, but that is simply not the case. Jay Solomonson had to fight the battle of losing his agricultural mechanics facility. I do not think he walked away unscathed but he certainly learned a lot. Darren Ropp and Patrick Powers have both experienced a great deal of student success in agricultural mechanics. Mr. Ropp trained the 2014 National Agricultural Mechanics Career Development Event winning team and Mr. Powers has had numerous students complete outstanding agricultural mechanics projects that are on display at the Iowa State Fair every year. I was also fortunate to get Joel Larsen to step out of the ivory tower for a moment to provide us with some insight from the state department of education. Finally, I saved Dr. Ryan Saucier and Dr. Curtis Langley for last. I have always truly envied the amount of time and training devoted to agricultural mechanics in Texas. If you have not investigated the agricultural mechanics related Career Development Events or the agricultural mechanics show hosted at the Houston Livestock show and rodeo I highly recommend looking into those events. I really hope you enjoy reading this issue!

The Challenges, Roles, and Purposes of Agricultural Mechanics in Modern School-based Programs: Thoughts from a Beginning Teacher

by Trent Wells

Laboratory teaching, particularly in the realm of agricultural mechanics, has been a historically-important portion of school-based agricultural education (SBAE). Its role occupies an important place in a SBAE program. More often than not, comprehensive agricultural mechanics instruction is expected of a teacher by local and regional industry, school administrators, as well as students. As a result, this content area is often one that is amongst the most challenging for beginning teachers to enter into for a variety of reasons. These factors often include a lack of teacher interest, familiarity, or experience with the content area, safety concerns, inadequate facilities, tools, and equipment, low consumables budget, and more. Moreover, some of these issues have arisen not from an inexperienced teacher's abilities, but instead from a poor-quality predecessor and his or her prior efforts (or lack thereof). Based upon the recognition of these concepts, the intimidation often felt by beginning teachers regarding agricultural mechanics instruction becomes clearer.

Before I tell about my own journey as a new teacher, I feel that it is necessary to state that agricultural mechanics is easily my favorite area of instruction. In my view, no other area of SBAE prepares students more for the real world than the hands-on experiences provided by different projects of various sizes and scopes, ranging from building wooden toolboxes and gun cabinets to painting and setting a new cattle head catch. These projects provide my students with opportunities to experience a learning environment that applies classroom knowledge (which seems to happen sporadically in other school departments) and results in a useful, tangible product in the end. Working closely with prospective employees for industry also gives me the chance to identify and distinguish between the work ethics and abilities between students, giving me credible evidence when employers ask me for information about an individual. Despite the challenges and concerns that arise from teaching agricultural mechanics, however, I still feel more comfortable teaching welding and metal fabrication than I do horticulture, which is not entirely common amongst beginning teachers. But this comes from my own history as a secondary and post-secondary student in SBAE.



Wood project construction emphasizes valuable life skills such as proper planning, selecting appropriate materials and tools, and carrying out a project to completion.

During my time as a student, I spent a great deal of time working in agricultural mechanics environments. My own agriculture teacher, while instructing in a wide range of areas, focused much of his instruction on agricultural mechanics and its applications throughout agriculture. Based on these experiences, I focused much of my post-secondary pursuits on further developing my competencies in agricultural mechanics. Even during my student teaching experience, my cooperating teacher dedicated much time in preparing his students through practical agricultural mechanics instruction. Thus, as a beginning teacher, my own experiences with agricultural mechanics have made me enthusiastic about teaching the content area. In my first teaching position, however, the challenges associated with the content area first began to take shape for me.

In taking on my initial teaching assignment in August 2013, I was met with some of the poor predecessor performance mentioned previously. The facility was a complete disaster, malfunctioning tools and equipment were in abundance, the program budget was less than substantial, and student expectations were abysmally low (in their view, agricultural coursework was "playtime"). Within time, tools and equipment were sorted and disposed of, facilities were rearranged, and standards were improved. However, these

changes were quickly lost upon me, as a new teaching opportunity closer to home was offered to me. Moving to my next position, I was met with significant improvement in facilities, available tools and equipment, and student, teacher, and administrator perceptions and expectations. In fact, rearrangement was minimal, and most of the year was devoted to hands-on instruction in agricultural mechanics.

Through the telling of my own experiences, I believe that I am better able to articulate my philosophy of the role and purposes of agricultural mechanics in modern SBAE programs. Through networking with industry professionals, university teacher educators, school personnel, and other agriculture teachers, I have come to realize the eminence of SBAE and its purposes of preparing students for the real world. In particular, agricultural mechanics offers a wide scope of opportunities for personal and professional development through all types of hands-on educational endeavors. For example, through having an instructional program that has on-site land, livestock, and greenhouse laboratories, many of my students' yearly projects revolve around improving and adding to existing facilities. Over the past year, my students have helped to frame and construct the greenhouse, install and repair gates and fencing for the livestock facility, assemble agricultural mechanics equipment, complete individual and group projects, and more. As a result, it is evident that a primary role and purpose for this content area can be to improve an existing SBAE program's offerings and potential.

However, the roles and purposes of agricultural mechanics do not stop here. As the eventual goal is to grant students the skills to obtain and retain employment inside and outside of the agricultural industry, it is my duty to grant as diverse a learning experience as possible. Anecdotal evidence suggests that workforce life requires a range of skills for success. Thus, educational life should grant these necessary skills. Much knowledge can be acquired through conceptually planning and developing a project, preparing a written plan, obtaining materials, following directions, and successfully completing an objective, regardless of whether a project is made of wood, metal, or cinder blocks.

Working with small engines provides students with techniques to solving real-world problems via diagnosis and troubleshooting.

Philosophically speaking, I also believe that the teaching and learning of agricultural mechanics can provide a direct link between the community at large and the SBAE program. It is not uncommon for my students to be refurbishing the floor of a parent's livestock trailer, building picnic tables for the local water park, or assembling furniture for an elderly community member. Such projects still fall within the scope of pragmatic instruction all the while directly assisting worthy program stakeholders. In my experience, students naturally desire to help others, and I find that this content area provides the opportunity for that outlet. In turn, benefits abound for all relevant parties.

Concluding this article, agricultural mechanics instruction, in short, occupies a very special place in SBAE programs across America. Teachers throughout the country rely on the content area to deliver practical instruction that can be useful in everyday life. As a beginning teacher looking to establish legitimacy in my coursework, I think this stands as a strong selling point for SBAE. Though not meant to be a point of conflict for teachers of other disciplines, I often ask my students about the usefulness of other classes' content within their daily lives. Their typical reply is that their agricultural coursework has been the most useful to them at home and, in some cases, work. As a teacher, this provides considerable comfort that I am indeed doing my job. In a career full of self-doubt and asking if the effort is worth the result, my roles and purposes as an agricultural mechanics teacher are to provide the hands-on, minds-on instruction that students, industry leaders, and administrators expect and demand. The challenges are worth it. The roles and purposes guide it. And as a beginning teacher, I embrace it.

Trent Wells is the Agriculture Teacher & FFA Advisor at Fayette County High School, Alabama.

Is Agricultural Mechanics Still Relevant in Todays High Schools?

by Jay Solomonson

As I reflect upon my twenty-one years of involvement in agricultural education, I have observed one major constant- change. Since the first day I took a seat in my freshman Introduction to Agriculture course, all the way up until present day there has been continual change in our profession. Students have come and gone, teachers either switch schools or change professions completely, career development events have seen major revisions, even the location of our national convention is now changing every few years. However, these differences seem miniscule to the recent changes I have seen in the high school agriculture curriculum.

The high school coursework I experienced was very much a cows, plows, and sows curriculum. We offered an Introduction to Agriculture class, three agriculture mechanics courses, and one rotating advanced agriculture class. It was very production and mechanics orientated. After completing my undergraduate degree from Western Illinois University, I returned to my high school Alma Mater for my first teaching position. While I was gone, the curriculum at my high school had seen a slight addition to coursework by adding their first agriscience class. Since that time, there has been a major push to further revamp the curriculum by expanding our focus and offering options for students to take classes in horticulture, veterinary medicine, agribusiness, and environmental science. Since there are only so many hours in the day, some of our classes would have to be eliminated. It was recommended that we completely phase out the agricultural mechanics curriculum. Some believed that the program was a financial burden on the school district due to the cost of supplies and equipment, while others believed that the concepts being taught in those classes were irrelevant for today's students.

After much deliberation it was decided to keep our agricultural mechanics program. We discussed both the pros and cons and decided that the benefits of the program outweighed the negatives. Our school district is currently offering a dual-credit agricultural mechanics course through our local community college, which I teach as part of my course-load. Going through this discovery process got me to think about the state of agricultural mechanics at the high school level and if the traditional agricultural mechanics curriculum offered at most secondary schools throughout the country is still a relevant and significant part of the evolving high school agricultural curriculum.

What Research Tells Us

Anderson, Velez, and Anderson (2011) indicate that an agricultural mechanics curriculum has always been a relevant, significant, and popular option in secondary schools across the United States. It seems like every year at my school we always have a large number of students that enroll in our agricultural mechanics course. My students indicate that they enjoy the hands-on nature of the class as well as believe that the skills they learn will help prepare them for a future career. According to the Illinois Agricultural Education website, 68% of the high schools that offer agricultural education courses in Illinois have an agricultural mechanics program (2013-2014 Summary of Agricultural Education Program Indicators). I believe that this is a good indicator that there is still a large interest in this area and at the very least, students still find the relevance of taking one of these courses during their high school career.

What Makes Agricultural Mechanics Relevant

I recently read in the online version of the *FFA New Horizons* magazine that there is a projected growth for the Power, Structural, and Technical Systems pathway in the agricultural career cluster. Many of my agricultural education students are interested in pursuing a career in this pathway. A number of these students will end up receiving some type of post-secondary training or apprenticeship in an agricultural mechanics related area after high school. According to the United States Bureau of Labor Statistics (2013), employment in agricultural mechanics related areas such as construction are projected to grow close to three percent annually, equating to over 1.6 million new jobs in the next eight years. Other types of related maintenance and repair occupations are also expecting to see a large increase in job growth. Even though all of our students might not directly obtain a career in agricultural mechanics, we are teaching them a variety of technical and transferable skills needed in today's workplace and around the home. Many graduates will come back to visit and mention that they used a particular skill they learned in

class such as wiring their garage or troubleshooting their lawn mower. The basic shop, home repair, and automotive maintenance skills students learn in our mechanics courses are invaluable for our students.

Potential Problems

So while there are obvious benefits of providing an agricultural mechanics curriculum, many schools are facing similar issues to that of my school regarding the future of their program. Besides tight school budgets, I have observed two major pitfalls to growing agricultural mechanics programs in my own state. First it is becoming harder to find qualified teachers to teach these classes. Many of the high schools looking for strictly an ag mechanics instructor often do not fill the position due to the lack of interested applicants. They either get filled by an industrial technology teacher or are shut down completely. I have also observed an agricultural mechanics skills-gap between our pre-service teachers and our more experienced teachers. The past several years I have had the opportunity to work with Illinois's pre-service agriculture teachers through the Illinois Association of Vocational Agriculture Teachers (IAVAT) Student Branch. Through this organization, I got to put on several in-service trainings in areas those students felt unprepared for, prior to their student teaching experience. Every participant always tells us that they need more experience with agricultural mechanics. They will admit that their skill level in agricultural mechanics is lacking comparing to their knowledge in the other agricultural curricular areas (animal science, plant science, leadership development, etc.). A recent study by Schultz, et al. (2014) set out to find the perceived capability of secondary agricultural education instructors to teach agricultural mechanics content areas. The study showed that the teachers seemed most comfortable with teaching basic safety and tool use while other areas such as electricity, plumbing, metal work and surveying practices were at the middle and bottom of the list.

How Do We Grow Agricultural Mechanics Programs

So, what do we do as a profession to grow agricultural mechanics at the high school level? First I believe we need to adequately prepare our pre-service teachers to teach agricultural mechanics. Many teacher preparation programs only require one or two courses in a mechanics or technical systems management program to graduate. I believe that the students either need more coursework in this area or they should receive additional in-service training on topics related to mechanics. Second, I think we need to continually market this curriculum to not only students, but parents, counselors, and administrators. We need to share with them the wide array of career opportunities in agricultural mechanics and that the careers in this pathway are high-paying and in demand. Last, I believe we need to continually update and evolve our curriculum to prepare our students for the jobs they will eventually get. I will always see a need for the traditional agricultural mechanics curriculum (electricity, welding, engines, construction, etc.), but who is to say it can't change and/or expand to cover other new technologies? I am excited to see the new CASE Agricultural Mechanics pathway courses and how it might change what we do in agricultural mechanics. Maybe it is what is needed to prove to those that want to abolish our mechanics courses that what we do is relevant and needed.

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Jay Solomonson is the Director of Career & Technical Education and the Agricultural Education Teacher at Orion High School, IL.

The Role of Agricultural Mechanics in High School Ag Education

by Darren Ropp

The role of agricultural mechanics in high school vocational education is a crucial one, especially to students aspiring to further study and/or careers in agriculture or related fields. The ag mechanics program at Prairie Central High School, a rural public high school of 640 students based in Fairbury, Illinois, is considered the cornerstone of the agriculture department. The program offers an impressive variety of courses for a moderately-sized school, taught by well-credentialed faculty, and supported in many ways by an avid community of loyal, helpful, and knowledgeable people. The Prairie Central FFA ag mechanics team, a natural extension of the academic program, and arguably an outgrowth of its effectiveness, recently earned a National Championship in competition.

The Prairie Central High School agriculture department makes available, in a logical sequence, a number of classes for interested students over the four years of their attendance. The beginning ag mechanics course is Small Engine Repair. This class exposes students to the fundamentals of troubleshooting, servicing, and repairing a variety of small internal-combustion engines, both two- and four-cycle engines, such as those used in portable power equipment. Students are also made aware of the many career opportunities for those with knowledge and marketable skills in small engines.

Welding is also part of a proper grounding in ag mechanics. Long ago it became apparent to PCHS ag department members that a course, or courses, should be devoted to just that topic. Welding students gain an understanding of not only performance skills in arc, acetylene, MIG, and TIG welding; but also hot metal, cold metal, and tool maintenance. The study of welding emphasizes math and science skills, with a nod to the needed integration of academic and vocational worlds.

In Construction and Electricity class, students learn how to wire switches and receptacles in branch circuits, electric motors, and electric controls. Developmental skills necessary for carpentry construction are included in the curriculum. C & E students are presented with hands-on experience in the form of erecting an out-building in the community. Advanced students, normally seniors, can elect for the popular Ag Power class. In Ag Power, instructors guide students in the complete restoration of an out-of-service tractor, normally donated to the class for restoration. "Restoration," in this context, means completely disassembling the equipment and replacing parts as necessary. The goal, again, is to engage students in a hands-on learning experience in mechanics. One student describes the first rumble/roar of the engine of a newly-restored Massey Fergusson T-35 or John Deere as "priceless."

Like any other in public schools, an ag mechanics program succeeds only with a savvy and dedicated teaching staff, backed by administration and a Board of Education, and supported by the school community. The study of agriculture is an evolving one with much of society yet to fully grasp its importance. The agriculture educator, therefore, is an enlightener of not only youngsters finding their way, but often also of the many layers of a school's constituency. His/her knowledge, teaching skill, willingness to extend the school day and year for students' needs, and ability to "network" in a community all serve to advance the discipline.

> Alumni members are the bridge between what was and what is in agricultural experiences. They provide money, manpower, and, most importantly, practical wisdom.

The agriculture staff at Prairie Central High School is vital to the department's success. Teachers teach and guide students, to be sure, but also advise, help, and praise one another in advancing toward true professional collaboration.

After school dismisses, it is almost as if another day begins for the staff; helping students prepare for FFA CDE contests, with often impressive results, or complete college applications. One of the most important parts of any teacher's job is to give advice to students and PCHS ag teachers embrace that role.

Students will understand responsibility, leadership, and teamwork – all "priceless." Photo courtesy of Jay Solomonson.

Programs such as ag mechanics, or ag ed in general, cannot have a major impact without community support. A group affectionately known as the Prairie Central Ag Alumni is the bridge between what was and what is in agricultural experiences for youth. The Alumni members are typically graduates of PCHS or one of its contributing schools (the District is twice consolidated). Some are parents of current ag students, whose purpose is to aid in sustaining and enhancing; the instructional program, the FFA, and opportunities for kids. The Alumni provide money, manpower, and most importantly practical wisdom.

A greater community's support for agricultural education is essential. The Prairie Central school system, as its title suggests, is a vast, rural area; 386 square miles of mostly farm ground and operations, with seven small communities spotted within. Agriculture studies are part of the social-economic fabric, in a sense. Farm families pervade and a culture of strong support is quietly evident. Folks just like to help, know how to help, and don't want to make a big deal of it. The greater community of Prairie Central clearly believes in ag education and in ag mechanics, has witnessed the successes, feels a part, and finds ways and means; again, money, equipment, wisdom; to make it so teachers and students can move with few obstacles through the experiences.

The agriculture mechanics program reaches further than your garden variety high school class. Students firmly believe they will apply the knowledge and skills they learn directly to their later lives. There is plenty of evidence to support the contention that hands-on experience is best. Hands-on experiences tend to "stick." Every class in the program promotes workshops and projects in allowing students an adventure of a kind, beyond "book" learning, into meaningful experiences.

It is evident that employers prefer candidates for jobs who can do things, as well as think, reason, and communicate. "Doing" is central to the agriculture mechanics field. Successful PCHS ag mechanics students typically can demonstrate, with confidence, essential skills and get, and keep, jobs. For the student who prefers college, the skill set is, of course, not lost on them. At selected colleges successful completion of Prairie Central ag mechanics courses not only provides an intellectual and skill underpinning, but can become the equivalent of six credit hours toward a degree!

Any student in the Prairie Central ag mechanics program will affirm that knowledge and skills gained are only part of the story. In the final analysis, a student can come away with other valued, but intangible, advantages. He/she will have come to understand responsibility, leadership, and teamwork all, as the tractor restorer says, "priceless." Students realize that helping one another is a good thing, and so is group problem-solving lending credence to the aphorism, "Two heads are better than one." The real-life relationships, e.g. between employer and employee, client and company, are known to PC ag mechanics students long before formal employment begins. If the project doesn't stand on its own or the restored tractor doesn't run, there is an unhappy boss, or, worse, an unhappy customer. The classroom is hard knocks. Better workers and; more importantly, better people; result.

An ag mechanics student sums it up: "High school can be rough for students trying to figure out what to do with their lives. Agriculture mechanics gives the option of learning what the job site is like and life skills that will be used for a lifetime afterwards. The Prairie Central ag mechanics program is successful because we, the students, believe in it 100% and see it for what it is, a great learning experience."

Darren Ropp is the Agriculture Department Chair at Prairie Central High School, Illinois.

High School Agricultural Mechanics: A Sacred Place Called .....The Laboratory

by Patrick Powers

Hands on learning takes place in many shapes and techniques throughout education. In Business Education, the computer has come to the forefront on hands on usage. In Family Consumer Science, reading recipes, measuring ingredients and finally creating a dish or desserts must utilize hands on usage while placing in the oven or on the stove without burning your hands. Industrial Tech loves the hands on approach as well. Servicing of cars, molding plastics, bending sheet metal, and drawing blueprints for a house to be constructed allows kids to experience the gratification of doing projects with their hands. Ag Education is no different. The "Ag Lab" with a cornucopia of opportunities for your students to see, learn, do, thrive in today's curriculum that is driven by some administrators to push the 4 year plan that includes post-secondary education to each and every child that walks in. As an educator, you know that can't happen. You know deep in your heart that kids love to do things/build things that can be useful to them after they leave the, sometimes, narrow-minded high school setting.

So what can you offer students? In my 32 years, I have been able to convince my administration (at the time) that it would be a great idea to have a class totally dedicated to the lab setting. The purpose was to give kids a broader sense of lab experience. Instead of the little time that is used in some of my regular classes to put in a small carpentry unit, this class met for the entire year for a class period and allowed students to plan, engineer, build and test large or small projects. I introduce oxy-acetylene usage and (SMAW) arc welding to kids to start off the semester. As kids progress, some you will find "catch on" quicker than others. This allows them to begin what I like to call higher user practices that includes (GMAW) wire welding and plasma arc cutting. From there, students "graduate" to start work on their own projects which could include several choices. Because of my longevity in the district, I can talk to the parents frequently to make sure projects get lined up as well as the required materials. No doubt, you will have individuals who utilize the old phrase of "nothing to do." Sit down with them and introduce them to the wonderful World Wide Web, better known as the Internet. Several projects are available for kids to see and do while in the lab. Don't worry about kids who don't do anything. I have found grades to be a highly motivating factor for high school kids. Grading daily is a pain, but, when done properly, it gives an accurate account of what the kid had done and how well they did it.

Our school recently began grading through formative and summative assessments. From my perspective, formative assessments come from the daily grind; homework, quizzes, in class assignments. Summative assessments come from the actual projects that are made by the students under your guidance. The thing that I have found over time is to make certain that you feel the student is comfortable with his or her ability to create and complete this project. Tell them your concerns prior to having it brought to the ag lab area. You may even make the phone call that other "Core" teachers hate to make. The one to the parent or guardian to ask them how they feel about the student's aptitude finishing this item. By making the call you open that communication to inform them specifically about what it is expected in class, since in all likelyhood, the kid will rarely do such a thing. Daily grading is based on a common 0-5 point system. A 0 score is achieved several ways: tardy, taking off safety glasses, or being absent other than a school sponsored absence. A 1 score is achieved if they have their safety glasses on but proceed to stand/sit/stare at other kids that are working the entire period. A 2 score is reserved for helping other people with their project, but not having their own and only working less than 50% of the time. A 3 score is reserved for people who work with other people's project over 50% of the time. A 4 score is reserved for a person who has their own project, but does not work the entire class period. A 5 score is reserved for those students who have followed all safety practices and have worked on their own project for the entire class period. Your guidelines may vary as you see fit, but generally as you watch kids work, the cream rises to the top and quite frankly the kids get out of it what they put into it.

One of my very first Department of Education school district reviews on gender equity happened when I first started teaching. I was very anxious and had a great deal of anxiety hanging over me at the thought of being evaluated by the big wigs of the Department of education. Sure enough, one of the first questions they asked point blank to

Ag mechanics gives students an opportunity to express themselves with talents that make them lifelong learners. Photo courtesy of Stacy Gartin.

me was, "How was I encouraging females to take Ag classes?" It was over 30 years ago, but I remembered stammering out something along the lines of "The door is open to all kids regardless of race or gender." That didn't satisfy the pundits, so they dug a little deeper at me. "What are you going to do exactly?" came the next shot fired. I thought for a little while and finally told them that I need to actually talk to the students individually to let them know that they can be a big part of the Vocational Agriculture (What it was called at the time) program by being involved and what it had to offer. Rome certainly wasn't built in a day and building the ag program took a lot of time to start and see change, but change did come in small increments. Five years later after I moved to a bigger school, my ability to recruit female students as well as higher GPA kids increased. I realized that I was able to draw all types of kids with different backgrounds and that is exactly what you want to have in your program. You will reach the entire spectrum of kids that will be educated in so many different ways, ESPECIALLY in ag mechanics.

I have been fortunate enough to have had many positive things happen to me and my FFA Chapter through the use of ag mechanics. Our state fair has instituted a point system for FFA Chapters to compete against each other by earning points through the numbers of exhibitors you have, the number of exhibits, and how well those exhibits did in the judging. In the ag mechanics area, the FFA Chapter has been able to capture the top place for the last 12 years in a row. Ag mechanics has given my students an opportunity to express themselves with talents that make them lifelong learners. The communication with the parents allows them to have a stake in the projects as well and the ability to bring the project to the fair which takes approximately and hour to an hour and a half to get to from my school district. The community takes pride in this success and works together to make it happen by being in the FFA Alumni Chapter and providing assistance through not only transportation, but ideas for projects and technical advice on large items such as equipment and tractor restoration.

I can't even begin to remember how many of my guys, but more importantly, my girls have been Champions in Ag Mechanics class areas at the Iowa State Fair. The girls really seem to take more pride in their accomplishments than the boys do. I asked one of my students what her thoughts were about ag mechanics and she surprised me with her response. "By being a girl in ag mechanics that the boys are a little shocked by how much knowledge you have and what I can do with a tractor or implement project. I have had several guys tell me they were impressed with the amount of mechanical work and how well the paint looked on my project," Tayler Jones said. "I have had the opportunity to meet a lot of cool people whose lives have been dedicated to ag mechanics and I truly appreciate the comments and compliments that they have said to me." "My ag mechanics background will come in handy as I am definitely going to follow this career path into my future post-secondary education," Jones also stated. I truly believe that you can make a difference in a student through ag mechanics. Do things you are comfortable with and then expand. I am well aware of school budgets and not so receptive administrators. Work with those people. Let them become your biggest supporters by showing them what kids can do in the sacred place I like to call……The Laboratory!!!!

Patrick Powers is an agricultural education instructor at Eddyville-Blakesburg-Fremont High School, IA

The View from the Ivory Tower: A State Department Perspective of Ag Mechanics

by Joel M. Larsen

As a former ag mechanics instructor, I have a passion for quality programs in welding, engines, and construction. Helping students to develop their technical skills is both challenging and rewarding. How we incorporate these within the ag mechanics curriculum and in our AFNR programs is the key for achieving program quality and student success. As we explore ag mechanics, it is important to focus on the pathway of Power, Structures, and Technical Systems found within the Career Clusters Frameworks model developed by the National Association of State Directors of Career Technical Education (NASDCTE) Consortium. (See more at: http://www.careertech.org/career-clusters#sthash.A4oO0a7W.dpuf)

The Minnesota Career and Technical Education (CTE) data show that this pathway has had the highest enrollment of any of the AFNR pathways since we have been collecting data for our Carl Perkins reports.

Career Exploration Curriculum in Power, Structures, and Technical Systems

Introductory courses in Power, Structures, and Technical Systems should allow students to develop skills in woods, power mechanics, and welding and metal fabrication. Tom Appel, Ag Instructor at Mountain Lake Public Schools, shares this observation, "We have a considerable amount of interest in agricultural mechanics with high school students. However, these students come with a lower skill set than we have ever had primarily due to the lack of background and experience in production agriculture. The basic woodworking and welding we do with freshmen is extremely well liked by the students. The same can be said of all the mechanic's units we teach; electrical, surveying, small engines, etc."

Kids love to weld and quality programs start by harnessing this excitement and desire to learn. It is the same with small gas engines (Power Mechanics), woods (Structures), and electricity connecting the student's desire to learn a new skill. Once we have created the interest and the skills, you can begin to move into the science, math, and technical reading which are needed to prepare for a career in this pathway. The goal of an introductory level course in Power, Structures, and Technical Systems should be to expose our students to the career options and opportunities within this pathway.

> The goal of an introductory course is to expose students to career opportunities.

Career Development Curriculum in Power, Structures, and Technical Systems

As students choose the area within ag mechanics they wish to focus on, the challenge of preparing them for entering the career field and post-secondary education is presented. We have all worked with students who have outstanding welding skills but they cannot read a blueprint. We have the student who can tear down an engine but cannot read a technical manual. It is critical that our programs and our curriculum provide these students with the opportunity to develop these skills. Bruce White, Agribusiness Service Technician Instructor, South Central College, Mankato, shares these observations of students entering the program. "Students are arriving with a lack of basic mechanical skills. As ag teachers, we have been so busy trying to fit in with graduation standards that technical skills have suffered. As the pendulum swings back our way, we need to be prepared as instructors to meet the challenge. There is a need for more technical training at the colleges and universities to better prepare our fellow instructors. We need to help those in the field that are in need of more training and encourage them to leave their comfort zone. Our students need the basic skills. If they can stick weld, they can wire feed weld. But if they learn to wire feed weld first, they have trouble with stick welding. They also need to learn the parameters of social media in the workplace."

The students who leave our ag mechanics programs need the skills and abilities that will allow them to make the transition from high school graduation to career and post-secondary education successfully.

Business and Industry Partnerships

Ag mechanics and technology businesses are looking for the next

generation of employees. They want well trained motivated employees who they can depend on to work safely and who are problem solvers. This past year in Minnesota, we have worked with the Minnesota Department of Labor and Industry on the Minnesota Agriculture Industry Council Pipeline Project. This project is based on a shortage of qualified agricultural mechanics. Our industry leaders are looking for ways to fill the pipeline from high school to the doors of their businesses. I have been in numerous meetings across Minnesota where business and industry leaders want to create partnerships within their schools and colleges that will provide them with quality employees.

This demand provides an opportunity to engage these leaders as active members of your advisory committees. All of our facilities need to be safe, clean, well lit, and include modern equipment. Our agriculture and manufacturing partners can help to match our facilities with their expectations and their needs. Your advisory committee members bring time, talent, and expertise that can enhance the Ag Mechanics and Technology programs.

Professional Development

There is a huge demand for professional development in ag mechanics and technology. Our teachers need strong pre-service training at a time when fewer of our ag education graduates have experience or backgrounds in mechanics. As a state supervisor, I see it as my role to work with our teacher preparation institutions, our post-secondary colleges, our professional organizations (Minnesota Association of Agricultural Educators - MAAE) and our industry partners to design and maintain professional development opportunities for our teachers. Providing opportunities for teachers to develop skills in welding, power mechanics, building trades, and technology are critical for their success. In addition to skill development, we need to provide teachers with curriculum resources that they can use in their program. Helping teachers match curriculum standards in the Power, Structure, and Technology pathway within their courses will assist them in developing a program that will meet the needs of their students and the expectations in industry.

Standards for Power, Structures, and Technical Systems

Standards have been the buzzword for secondary schools this past decade. The question becomes what standards should we be following? Are we talking about curriculum standards, program standards or both? From a state perspective, I would suggest that both are important and critical to review. In Minnesota, we do not have state wide curriculum standards for career and technical education programs. This is both a blessing and a curse! Standards for CTE programs are developed at the local level in Minnesota. This allows me as a state supervisor to direct our teachers and curriculum directors to the National Agriculture, Food, and Natural Resources (AFNR) Curriculum Content Standards developed by the National Council for Agricultural Education (2009). (see https://www.ffa.org/thecouncil/Pages/index.html) We have used these standards in the Power, Structures and Technical pathways to develop the curriculum blueprint for Technical Skill Attainment (TSA) at the secondary and post-secondary level. Our business and industry leaders in ag mechanics have reviewed these curriculum standards and our curriculum blueprint.

The second area where standards are important is in the design of an ag mechanics program. The first document I would recommend teachers and advisory committees to review would be the National Quality Program Standards for Agricultural Education developed by the National Council for Agricultural Education. The section on facilities and equipment provides an excellent opportunity to look at the space, safety, and equipment resources. Many of our ag mechanics facilities need a facelift. Our shops need to evaluate the quality of the lighting, the cleanliness of work areas, and equipment. When we think about professional development for agriculture instructors, we consider skill development. We also need to provide professional development for our teachers on facility and equipment management.

Agricultural mechanics is a large component of Agriculture, Food, and Natural Resource Programs. It is critical that we provide our teacher instructors with the professional development, the curriculum and program standards, and the management concepts for program success. This requires an approach that includes departments of education, teacher preparation institutions, state and national agriculture teacher associations, and our business and industry partners in providing guidance and leadership to for agricultural mechanics programs.

Joel M. Larsen is a Program Specialist in Agriculture, Food, and Natural Resources (AFNR) Education, Minnesota Department of Education.

The Role of Agricultural Mechanics in Texas School-based Agricultural Education

by P. Ryan Saucier and G. Curtis Langley

Formal agricultural education courses were first offered in Texas public schools in 1903 to elementary school students in Henderson, Texas (Stockton, Dillingham, Cepica, & Eggenberger, 1988). At this school, a course entitled Elementary Agriculture was established with the intent to educate rural youth about agrarian skills and techniques (p. 1). As time passed, the popularity of localized agricultural education programs increased throughout the state with legislation and funding from the local, state, and federal levels.

In many communities throughout Texas, agricultural mechanics courses are a pivotal part of school-based agricultural education programs in rural, suburban, and urban areas. These career-based courses focus on teaching relevant technological and mechanical skills to students within the realm of agriculture. The ultimate goal of these courses are to prepare youths for careers in agriculture and industrial related career paths. Currently in Texas, there are 1,700 Agricultural Science teachers instructing 106,659 (as of fall 2014) students at 1,029 agricultural education programs (Texas FFA Association, 2014).

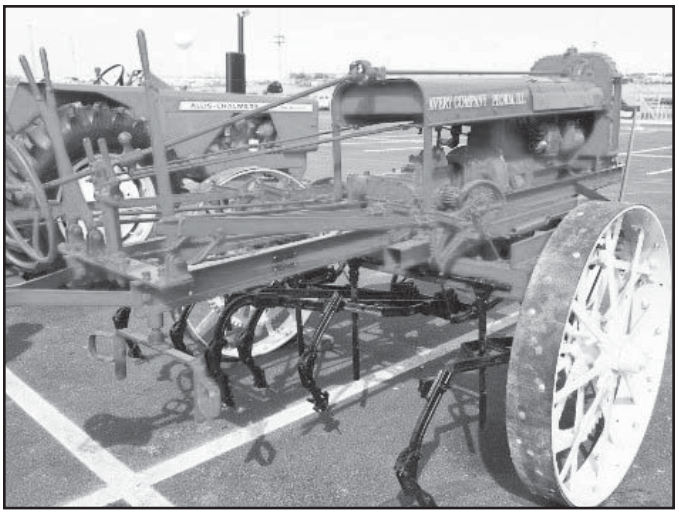
Classroom/Laboratory Instruction

In 2010, the Texas Board of Education implemented a revised state curriculum (Texas Essential Knowledge and Skills or TEKS) for all school-based agricultural education programs. This revised curriculum changed from a previous state curriculum that included two half credit courses (semester courses) for middle school students, 37 half credit courses (semester courses) and eight, one to three credit courses, for high school students. The revised curriculum now offers 24 courses that vary from half credit to three credit courses for middle school and high school students. Communities can still offer localized courses specific to their individual student's needs, but these state mandated courses serve as a framework for public school programs to function. These semester and year-long agricultural mechanics related courses include: Principles of Agriculture, Food, and Natural Resources (a portion of the curriculum is devoted to agricultural mechanics), Agricultural Mechanics and Metal Technologies, Agricultural Facilities Design and Fabrication, and Agricultural Power Systems (http://www.txeducationalexcellence.com/).

In almost all school-based agricultural education programs in Texas, both a classroom and laboratory are used to teach agricultural mechanics TEKS to students in grades 8 to 12. Typically, a desired student enrollment is 20 students to 1 teacher. However that number can vary widely based upon the size of the school, location of the school within the state, and the popularity of the courses/program. In many schools, student enrollment has been limited to a manageable size based on the size of the classroom/laboratory and safety concerns within the laboratory while teaching technical based skills. In some schools student enrollment can be a few students to 40 students per teacher and per course.

Availability of laboratory equipment and tools, age of the equipment and tools, and condition of the equipment and tools varies widely across the state based upon program budget, competency of the teacher to correctly manage an agricultural mechanics laboratory, and local support for the program. However, in most agricultural mechanics programs, the following agricultural mechanics skills are taught with a varying degrees of emphasis based on local need: shielded metal arc welding (SMAW), gas metal arc welding (GMAW), gas tungsten arc welding (GTAW), oxygen fuel cutting and welding (OFCW), plasma arc cutting (PAC), light structural carpentry, fin-

In almost all school-based agricultural education programs in Texas, both a classroom and laboratory are used to teach agricultural mechanics.



In Texas, there are several statewide (major) agricultural mechanics project shows where students can display their projects ranging from fully restored tractors to agricultural implements.

ish carpentry, plumbing, electricity, handtools, handheld power tools, stationary power tools, small gas engine technology, drafting, and metal fabrication.

FFA

The Texas FFA Association serves as the guiding entity for agricultural education/ FFA programs in Texas. In this inter-curricular program, agricultural mechanics is highlighted through several forms of competition. In terms of Career Development Events (CDE), the Agricultural Technology and Mechanical Systems CDE (ATMS) and the Tractor Technician (TT) CDE are the two contests that engage FFA members and allow these students to showcase their unique set of knowledge and skills. The Texas ATMS CDE "tests both technical and agricultural mechanics skills. A team of three or four members must demonstrate their ability to work with others while solving problems. During the event, members complete a written exam and demonstrate problem-solving and hands-on performance skills. The event takes a systems approach and emphasizes machinery and equipment systems, related industry and marketing systems, energy systems, structural systems and environmental/ natural resource systems" (Texas FFA Association, 2014). Texas generally follows the model of the National ATMS CDE (http://web.missouri.edu/~schumacherl/natcon.html) except that the Texas ATMS CDE only utilizes three skill areas while the National ATMS CDE utilizes six skill areas. Although the National ATMS CDE five year rotating event theme is followed, input from teachers is highly coveted at the previous summer's teacher professional development conference. Teachers' input is used to determine the type of machine used in the machinery skill area and to select the other two skills that will be used. Planning for each year's ATMS CDE is started two years in advance. This allows the state superintendent (typically an agricultural mechanics professor; 2 year term) the opportunity to recruit other agricultural mechanics professors from around the state to aid in the planning and implementation of the CDE.

Unique to Texas is the Tractor Technician (TT) CDE. This CDE is a three part competition, where a team of three, individually appraise components and parts from tractors and agricultural implements and make service recommendations based on appraisal and complete a written exam. Finally the team of three members, working as a group, will compete in locating and correcting five deliberately placed malfunctions in diesel fueled tractors and safely navigate the repaired tractor through a driving course within the 30 minute time limit. Multiple invitational contests are offered across the state (October to January) with area contests being held in January and the state TT CDE being held at the Houston Livestock Show and Rodeo in March. This CDE is highly supported by the tractor industry that provides the use of multiple tractors for each invitational, area, and state contest. Also unique to this CDE is the industry partnerships that provide awards for top individuals and teams ranging from fully furnished, multi-level tool boxes worth $10,000 (+) to scholarships provided by technical schools. During the summer teacher's professional development conference, teacher's input is sought to help develop a rotation of manufacturers for the state TT CDE and the model of tractor used.

Supervised Agricultural Experience Program

Through the Supervised Agricultural Experience (SAE) program, Texas FFA members are engaged in numerous SAE programs related to agricultural mechanics. In fact, many Texas FFA members are involved in individual and/or group SAE projects that fall into the Agricultural Mechanics Design and Fabrication SAE Award Area. These students are involved in either tractor restoration projects or fabrication projects (design and construction) that are displayed at agricultural mechanics project shows at school district, county, state, and national levels. Projects range from fully restored tractors to agricultural implements and shop equipment to gooseneck stock trailers. In Texas, there are several statewide (major) agricultural mechanics project shows where students can display their projects. Each major show is supported by countless volunteers

and industry partners that provided awards for students displaying the highest quality projects. Awards for these project shows range from fully furnished, multi-level tool boxes to portable welding machines as well as large ($12,000 +) scholarships . Five major agricultural mechanics project shows are held across the state each year at: the State Fair of Texas Youth Agricultural Mechanics/ Tractor Restoration Projects (Dallas - October), the Ft. Worth Livestock Show and Rodeo Junior Agricultural Mechanics Project Show (Ft. Worth - January), San Angelo Agricultural Mechanics Contest (San Angelo - February), San Antonio Junior Agricultural Mechanics Project Show (San Antonio - February), Houston Livestock Show and Rodeo's Agricultural Mechanics Project Show (Houston – March).

Pre-Service for Agricultural Science Teachers

As previously identified in the article, there are a large number of students involved in agricultural education in Texas (N = 106,659) and subsequently a large number of agricultural science teachers (N = 1,700) are needed to educate these students. To supply a profession that typically has a 20% +/- annual turnover, there are 11 institutions in Texas that graduate accredited Agricultural Science Teachers. Some institutions graduate students only in the spring semester and a few institutions graduate students in both fall and spring semesters. In order for new teachers to be well prepared for the requirements of being an educator, curriculum at these institutions are designed to give the new teacher both the knowledge and skills needed for student instruction and classroom management as well as technical knowledge involving agriculture. Typically the technical knowledge of the curriculum is based upon the following areas of study: agricultural mechanics, animal science, horticulture, crop/plant science, leadership, and soil science. However, due to recent mandates put in place by the Texas Higher Education Coordinating Board (2008), all bachelor degrees in Texas must be capped at 120 semester credit hours. This limits the number of courses required of students and also limits the depth of education gained in technical agriculture.

After completing the rigors of an undergraduate education, teacher candidates must complete a student teaching experience (included in the 120 semester credit hour bachelor degree) under the direction of a mentor teacher at a quality agricultural education program and pass two state mandated examinations: Pedagogy and Professional Responsibilities (TExES 160) and Agricultural Science and Technology 6-12 (TExES 172). However, there are also alternative certification routes for degreed individuals who want teacher certification. These alternative certification programs are typically supervised by one of the 20 education service centers throughout Texas.

Professional Development for Agricultural Science Teachers

To continue the education of existing teachers in Texas, a statewide mandated program requires all teachers, who do not possess a lifetime Texas Educator Certificate, to engage in 150 Continuing Professional Education (CPE) clock hours every five years (Texas Education Agency, 2014). These CPE hours can be gained at the local school level through professional development workshops, at programs offered at the regional Education Service Centers, at universities throughout the state offering technical workshops, or at teacher professional development conferences. For Agricultural Science teachers seeking agricultural mechanics related professional development, CPE hours are typically gained by attending professional development workshops at universities, Education Service Centers, and/or at the annual summer professional development conference. At several universities across Texas, agricultural mechanics workshops are typically offered in June or early in the fall semester. Recently, these workshops have ranged from metal fabrication to small gas engine technology to CDE specific offerings and are often sponsored by industry related businesses, i.e. Briggs and Stratton, John Deere, and Lincoln Electric. At the annual summer professional development conference, agricultural mechanics related workshop topics have typically included themes such as: tractor safety, basic instruction of agricultural mechanic projects, new product presentations by industry, and junior agricultural mechanics project show updates.

Dr. P. Ryan Saucier is an Assistant Professor of Agricultural Systems at Texas State University.

Dr. Curtis Langley is an Assistant Professor in Agricultural and Consumer Sciences at Tarleton State University.

Assessing through Technology

by Lane Woodward

Instruct, assess, analyze, instruct, assess, analyze, instruct, and the madness continues. As educators, we fall too easily into this pattern, or method to our madness, of providing students instruction followed by an assessment of our student's' abilities to absorb, process, and regurgitate the lesson. We then analyze the outcome of the assessment to decide where to go next with instruction. As educators, our administrators expect us to grasp the attention of our students from bell to bell, our students expect us to entertain them from bell to bell, and parents expect their students to excel from bell to bell. As agriculture educators, we are asked to do even more between bell to bell while simultaneously achieving success daily.

We are in an era where both the teachers and students crave the use of technology. Instructional methods have not changed over the years but the tools we have access to and use change daily. There are some educators who are not on the technology train and are not using it in class. I think that is because these teachers are unsure of their own ability to use the technology. The field of agriculture has been enriched by the prolific development and use of the latest technology.

Obviously assessment is a huge portion of education. We have pretest, post-test, end of unit/chapter test, pop quiz, end of course exam, certification exam, and state and district required assessment. However, as agriculture teachers, we also utilize projects, labs, and practicums as forms of assessments. We understand the importance and validity of these types of assessments whereas the traditional educators tend to stick with the more traditional forms of assessments.

Our school is very fortunate in that we are recipients of a technology grant for our Title 1 program that allows us to have a classroom set of iPads with additional money to purchase various applications to use in our classrooms. I learned that in order to complete any assignment using a specific application I had to learn and interact with the app first. We spent a week during class time exploring the applications. I provided time for my students to explore the applications the school district preloaded and we discussed how and why we could use the applications. Of course their favorites were the drawing applications, which are pretty similar to the paint accessory on most computers, and the camera/video. I needed, however, to get more out of it than just my students being occupied and having fun in my class while playing tic-tac-toe or drawing faces on pictures. I want my classroom to be fun, but I need to ensure that students are learning. Remember we must ensure bell to bell excellence. Technology allows students to be creative and show their individuality and helps teachers maximize learning by utilizing different learning styles.

For years, teachers have been seamlessly implementing technology into their lesson plans by simply adding a demonstration video, pictures, or some type of computer-based instruction. Sadly these types of technology uses are teacher oriented and not student oriented. The new teacher evaluation systems evaluate based on the amount of student centered instruction. How much freedom do you provide your students with designing their own instruction and assessments?

It is probably safe to assume that almost everyone has seen at least one YouTube video. These types of videos are a great way to expose your students to demonstrations you can use as part of your safety lesson, or for learning how to complete a specific project. What if your students were the ones creating those videos? Students spend hours upon hours surfing the web laughing at videos and then trying to duplicate the funny ones, but what if our students were the ones producing these videos that others were watching and downloading? The Internet has made it very easy to share and research information. I am not even sure how teachers taught and students researched prior to Google. I'm pretty sure it took much more time and the cost didn't stop there. There was fuel for transportation to the library to read books and then the presentation of their answers by putting pen to paper and or poster-board. After all of that effort how many people were impacted by their learning?

By using a simple video camera feature on any phone, camera, iPad, or tablet you can begin your journey to producing and publishing amazing video projects with your students. I use a digital camera or a smart phone camera to capture the video and then we use a video creator on the computer such as Movie Maker. You by no means are required to use a movie creator but this allows you to add sound or incorporate multiple videos or pictures. Again, the key to becoming savvy with a video project creator is simply not being scared to click buttons and see what they do. I would recommend saving often.

This practice has helped maintain my sanity as students have deleted entire projects with one click or lost their project during one of those power outages that seem to always occur while we are in the computer lab.

I am sure you are thinking, "I don't have this equipment or the money to buy this equipment." My answer is: when there is a will, there is a way! Most students have a smart phone or some type of device they can use to record and most schools have at least one computer with a video editing program of some type. Around banquet season I always bring in my own technology to help my officers finish up videos during the one week of crunch time that takes place just before banquet. You will have to find what mixture of technology works for you. I would suggest starting slow and see what works and then begin to add different things as projects evolve. After producing your video you can open accounts on sites such as YouTube or School Tube. Some schools may already have accounts. I would check with your technology department and see what requirements or policies your school has regarding students and the use of these video sites. You do not have to post these videos on the web. You can keep them and use them in classroom instruction or as examples of student work for future classes. If your school has a TV production class you might even want to use these videos to showcase your program during one of their shows.

Now, I know that assessment is one of the more important components to a complete educational program so how do these videos satisfy the need to evaluate? I am sure that your wheels are turning with ideas of hundreds of applications for a video assessment. In my forestry class students divide into groups and create skits to demonstrate one or two safety rules. They film their skit and I compile all of the videos and we share our "what to do and what not to do video." I started to use video assessment in my landscape class to do something similar but ended up using their videos during my introduction to agriculture class. By having the students film a video project you are having them write out the skit or presentation and then refine it. The writing step allows for you to check for understanding as you check their rough drafts. If a student does not know or understand the material it is very clear during the production process. This gives you time to identify individual students and provide them the help needed. It also allows for student centered instruction. The added writing component allows for some integration of common core instruction which can inevitably help meet your school's learning goals. I have often grouped students based on ability to complete video projects. By requiring that they produce a video compilation project it allows me to ensure quality projects that best provide an acceptable level of achievement for each individual student.

One of the more exciting education trends is project based instruction which allows for collaboration and moves completely away from traditional paper testing. This is where the variety of electronics and applications comes in handy. As mentioned before, I am lucky enough to have access to technology every day in my classroom. This provides me with the opportunity for a variety of assessment tools. While teaching both animal and plant science I used two drawing apps "Skitch" and "Doodle Buddy." With these apps a student can take a picture either from the Internet or off of the camera roll and label that picture to identify vocabulary. To kick-off a section of animal science introducing livestock evaluation, I knew one of the key concepts to being successful with evaluating livestock is terminology, however I don't have access to all of the traditional species at our school farm. I had my students select images of the different species and save them to their devices, then using a drawing app they labeled parts and used as many terms as they could to describe the animal. During the plant science unit I had my students dissect an actual flower and take pictures of the process. Then they imported those pictures into an application call "Pic Collage" and made a dissection collage. They saved that as a photo to their camera roll and then completed the part identification and labeling using the drawing app. It took about two days but the students enjoyed not only the traditional dissection but the elements of photography and creativity they were able to express. These apps allow me to assess my student's varying abilities and provide smooth transitions to the next topic in class. There is also an app called "popplet lite" that allows you to create flow charts and word webs. Traditionally you would use an app like this for instruction not assessment but it is a great way to have students put information into a graphic organizer and then assess how much your students are digesting as well as what they are connecting.

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Lane Woodward is the Virginia FFA Executive Secretary and former Agriscience Teacher at Taylor Middle/ High School, Florida.

Corralling Animal Science Graduates into Agriculture Education: One Undergraduate's Journey to Becoming an Agriculture Teacher

by Melissa S. Robbins

As a child, my mother instilled a service-oriented mindset. She would drive me to activities with family and friends. As I would get out of the car, she would say "Have fun and be a good helper." This saying, "be a good helper" was repeated in all social and school settings. It was most likely my mother's way of making sure I behaved. However, it became my goal in life to help others and to serve them by "being a good helper."

When I was in middle school, I decided I wanted to be a doctor and help people by saving lives and treating them when they were sick. I became fascinated with medicine and started to plan for the day I was going to be "Dr. Robbins." During all of this planning, I was also involved in the Texas Junior FFA program while my older sister was in the local Denton-Ryan FFA Chapter. In 8th grade, we had a high school preview day and I was able to visit the agriculture building where I listened to the agriculture teacher, Mr. Walton, talk about all of the career opportunities that were available through agriculture. One of these was being a veterinarian and helping people by treating their animals. A light bulb went off in my head, I'll combine FFA with medicine and help people by becoming a veterinarian!

For the next four years, I followed the secondary school veterinarian track. I took as many agriculture classes as possible; Principles of Agriculture, Advanced Animal Science, and Equine Science along with any Health Science Technology Education classes that were offered. I started preparing applications to universities. In the back of my mind, I had picked other careers that I would consider if my brilliant plan of becoming veterinarian didn't work out. This list included becoming a game warden, USDA inspector, and perhaps even an agriculture teacher. During my high school senior year, I began to doubt my planned veterinary career. It was also clear that we wouldn't have the funds for an eight year veterinary degree. As a result, I began to look at alternative universities in Texas that offered a Pre-Vet degree option. I ultimately decided on Tarleton State University.

I began my undergraduate degree in Animal Science during the fall of 2009 at Tarleton with plans to graduate in May 2013. I could then apply for vet school at Texas A&M University. I lived in the dorms, made friends with other Animal Science majors and maintained a GPA greater than 3.0. I thought I was on-track until I reached Organic Chemistry I. After the third attempt, I finally got a C. At this point I was a junior with Organic Chemistry II, Physics I & II, and Biochemistry still remaining on the degree plan. Further, it was clear that these classes would need to be passed with A's in order to improve my GPA. I began to question if being a veterinarian was in my future.

After much thought, prayer, and advice from my advisors and friends, it was my mother who reminded me of what I wanted to do: Be a helper. I went back to that list of "backup" careers. Game Warden: I like wildlife but hadn't taken any wildlife courses in the degree program. USDA Inspector: I like meat and think it's a great industry but it's not my forte. It was then that I knew where I belonged. I like talking in front of people. I want to continue working with animals. Further, I was obviously drawn to the ability to make a positive difference in the lives of others by involving them in the greatest service-orientated organization in the world (FFA). Just like that day in the 8th grade, a light bulb went off.

After making my decision, I found myself in the Agricultural Education office at Tarleton State University explaining my situation. The faculty set up a plan where I could graduate in Animal Science and immediately begin a Master's of Science (MS) degree Agricultural Education with teaching certification. Not surprisingly, many other students have agriculture degrees and seek to earn a teaching certification through the MS program. As a result, Tarleton State University now offers this opportunity.

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Melissa S. Robbins is a Graduate Assistant in the Department of Agricultural and Consumer Sciences at Tarleton State University.

The SAE Struggle: Tips to Get All of Your Students To Have a Quality Program

by Jay Solomonson

When I started at my current school district over ten years ago, I had one student (out of sixty) that had a supervised agricultural experience project. I thought that the program I was stepping into must have been an anomaly, right? The first thing you learn in your teacher education program is about the three-circle agricultural education model and that a quality program has each of these components. How can this Ag department only have one student with a SAE? What was inhibiting the previous teacher from incorporating them? Were there similar issues facing other high school agricultural education programs that were preventing them from implementing the SAE component of the agricultural education model?

Shortly after I started teaching, Talbert and Balschweid (2004) did a study on the factors that affected student participation in FFA and related activities. In this study, they found that of all the agricultural education students surveyed, 61.5% of non-FFA members and 33.7% of FFA members did not have some type of SAE program. Since this research was conducted close to a decade ago, I wondered if the percentage of students with a project might have changed. The recently released *2013 Illinois Agricultural Education Annual Report* provided data indicating that only 41% of agricultural education students in the state of Illinois had a SAE (Illinois State Board of Education, 2013). As you can see, the percentage of students without a SAE is similar to that of data collected over ten years ago. Other studies show similar trends. So if the SAE component of our program is as important and essential as we were taught, why do so many of our students not have a project?

Foster (1986) suggests several factors could be attributed to the lack of student participation in SAE programs. These included the agriculture teacher's lack of experience planning and conducting non-traditional SAEs, lack of teacher supervision time, lack of facilities for SAEs, student dislike for record keeping, and an overall lack of student desire to complete the project, amongst others.

I believe many teachers struggle with these very same issues, myself included. The following are some tips and tricks I have incorporated into my program that have helped us go from one student having a SAE to 100% of my students having a quality project.

How to Get Started

For me, one of the most difficult aspects of implementing supervised agricultural experiences was introducing them in the classroom. Everything from helping students choose a project to teaching record keeping, I could not find an adequate resource that would expose my students to everything the SAE program entailed- so I made one. After my first year of teaching, I started to develop a handbook that students could use as a reference for completing the project. It has evolved over the years to include chapters on types of projects, proficiency areas, choosing an innovative project, financing your SAE, components of the record book, how to fill out the record book, etc.

I bind the booklet and pass this out to all of my students at the beginning of the school year. I also post an electronic copy on our class website. The handbook has served as the SAE "Bible" for our program that students use throughout the school year. It has even been so popular that other high school programs have adopted it for their own programs. The handbook has recently been added to the NAAE Communities of Practice website. Just search for SAE handbook.

Non-Traditional SAEs

Traditionally, SAEs were designed for students with farm-based projects. SAEs have evolved to include areas such as agribusiness, agricultural placement, agriscience research, and exploratory projects. One of the ways my program has diversified and expanded is by integrating the exploratory and research SAE areas. These types of projects were an easy way for my non-traditional agriculture students to have a quality project. They are both projects that do not need a large investment of time and money and work well for students that live in town. They are also great for those students who might only take one agriculture class in their high school career.

The requirements for the exploratory project are a career research paper, portfolio, and job shadow. The agriscience project consists of completing a research paper and display. These are projects that every one of your students could easily complete in one semester.

Tips on Supervising SAEs

With tight school budgets, extended contracts are continually being cut or reduced from the agricultural teachers salary. We all know that SAE site visits and project supervision are important for the program, but it is becoming harder to justify spending the extra time and effort in the summer on these tasks without the proper compensation. Personally, I have always had a nine-month contract. When I was single and didn't have young children, it didn't bother me to use my "spare time" traveling to students' farms or places of employment for SAE visits. I enjoyed meeting parents and employers as well as providing on-site assistance and supervision for student projects. But now that I have a family of my own, it is difficult to justify that unpaid time away to my family.

I began to question what could be done to insure that every student could still have some guidance and supervision without me actually being there. The activity we tried that seemed to work out the best, was virtual SAE visits. Most of our students have some type of personal electronic device (cell phone, I-pad, etc.) at their disposal. We could schedule a virtual visit and by using software such as Skype or Google Hangout, I was able to take a virtual tour of a student's farm or personally see a student's agriscience project from my office or my own home.

Facilities for SAEs

Like many other high school programs, I am seeing a decline of students that are coming from a farm. However, I am observing an increase in the number of students that would start an entrepreneurial animal or crop project if they had a place to do it. To combat this issue, I either offer to help the student find a place to do their project off-campus or I (sometimes) offer to keep their project at school. In the past ten years our school laboratory facilities have expanded to include an agriscience lab, greenhouse, aquaculture tanks, mechanics shop, test plot, and a small animal lab. Students can request to utilize any of these facilities for their project as long as they agree to certain terms. This has essentially eliminated the student excuse of a lack of facilities for their SAE.

How to Make Record-Keeping Fun

When surveying students, I typically discover that the thing they dislike most about SAEs is the record keeping aspect. Many are confused about how to fill out the record book and even more do not see a direct connection on how learning these skills will benefit them in the future. Throughout my teaching career, I have borrowed a few ideas from other agriculture teachers on how to teach the record-keeping component to my students. To introduce record keeping, I have my students fill out a blank record book while playing Monopoly. They will fill out a financial statement, complete a budget, track inventory, and record income and expenses in a journal. They use the same pages we use for our record book. We play the game for three days in class while the students are tracking every move they make. I then have them complete a practice problem for the type of project they want to complete. We finish the unit by explaining how these records help determine the financial health of the business or household and the application to their everyday lives.

How to Motivate Your Students

This is an area where I struggle the most. As an agriculture teacher, I know the benefits of the SAE program and I can explain to students those benefits. However, unless the students are intrinsically motivated to have a quality project, you will need to provide some time of incentive for students to keep records and complete their project. I have done everything from extra credit to monetary awards, but the thing that has seemed to work the best is a completion trip. If a student has a certain amount of FFA points and completed their SAE project they would be eligible to attend a trip exclusively for them. Our chapter SAE committee gets to plan the event and determine how members would qualify. This trip has seemed to motivate most of my students to complete their projects as well as participate in more FFA activities.

Summary

Hopefully this article has provided you with some tips or pointers that you might find useful in your attempt to achieve 100% SAE participation. Every school and situation is different. This is not something I completed in one year. It has evolved over time and changed based on the students in my program. Take your time and do what is right for your program- you will get there! Remember that SAE success isn't measured by the number of state FFA degrees or proficiency plaques on the wall, it is by the experiences your students have, the skills they acquire, and the work ethic gained.

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Jay Solomonson is the Director of Career & Technical Education and the Agricultural Education Teacher at Orion High School, IL.

Future of Urban Leaders

by R. Chris Ruscher

Growing up I had spent weekends and every summer since I can remember helping my grandfather on his ranch in Muldoon, Texas. This was an amazing experience that exposed me to a different way of life. I loved cattle and learned a great deal from grandfather. I remember listening to his stories of being in the FFA back in the late 1940s and every time after he would finish telling of another great adventure in agriculture he would follow up with "too bad they don't have FFA in Aldine ISD." My grandfather runs the cattle operation that his grandfather started, but they called Humble, a suburb of Houston, home. Every opportunity that presented itself, I would make the almost three-hour drive to Muldoon with him just to enjoy the agricultural lifestyle. As I got older I tried to find a way for my parents to move to the country so that I could show livestock at the Houston Livestock Show and Rodeo however it just seemed as though that dream continued to slip further away until I just assumed I could not be in the FFA. In 1996, I walked into a classroom as a freshman football player so that we could watch the film from our previous game. The empty room we were using was the agricultural science classroom and there were FFA banners hanging from the ceiling, and I felt I had been cheated out of an opportunity! Until that point I had no idea that Nimitz High School in Aldine ISD on the North side of Houston, Texas would even have a FFA program. Almost immediately I sought out the agriculture teachers and found my counselor so that I could be in the FFA the next year.

When I finally enrolled in the Ag 101 class with Mr. Michael Johnson and I quickly realized that there was much more to the FFA than I had thought. Soon I began to participate in career development events and leadership development events with a special fondness for chapter conducting. The FFA changed the course of my life, teaching me communication, time management, record keeping and most importantly leadership skills. This journey changed my career pathway as well. I knew that I wanted to work in agriculture and give back to my urban community, but I did not realize that the answer was staring me straight in the face. Upon graduation, I went and obtained a degree in Animal Science and worked in a sales based job for one year after college when my agriculture teacher called me. Mr. Johnson said that his teaching partner took another job, and he wanted me to come work with him. Although I was honored, I asked for time to think about it because it meant that I would have to live in the rapidly growing Houston area. After a couple days of considering this job endeavor I finally decided to give at least one year of teaching a try and if I did not like it then I could move on to something else. In the days to follow I went through the system for hiring and found myself that August staring at a group of freshmen that were staring back at me in the same classroom that I first found the FFA. They were scared and so was I because this was not the same school that I had attended. It was the same building, but the students and the atmosphere were completely different.

The 14 year old freshmen looking at me truly thought that a heifer was simply a term used to call their classmates something that could be taken as inferior. I had found myself sitting in an urban high school that had lost touch with what the agricultural systems are that provide for our very existence. This issue worried me for quite some time because it was a problem that needed to be solved. Just like all creatures, when in doubt we focus on what we know and I knew how about the importance of agriculture. As quickly as I could I began to explain the relevance of agriculture, FFA and the leadership skills that can come from the program however as I looked out at my classroom I only received blank stares and no responses. This just fueled the fire more to determine what I would have to do to educate these students and to keep my program from collapsing. I looked to other urban schools, examined any research, and attended workshops on engaging urban students trying to find a solution, but realized urban was not the problem. Having minorities was not the problem.

The problem was we were an urban program where minorities are the majority and they were all economically disadvantaged. According to the Aldine ISD website, 84.3% of our student population lives below the poverty line (Aldine ISD). I would ask myself "How was I going to teach these kids?" The more I pondered this question the more I began to realize that the leadership skills I received through the FFA were my greatest tool and if I planned to pass these on to the students I would need to show then teach. Agriculture and the FFA were foreign to these kids so I began to expose my students to this lifestyle. I soon realized that I was trying to model a set of skills that these kids were not accustomed to and if I expected a change in my result I would have to change the process and become more adaptable. By this time I felt as though I had wasted half of the year, but I was determined

to make up lost ground.

It became evident that the students in that program wanted someone to genuinely invest in them and as long as they felt that you were giving your best to help them they would do their best for the FFA chapter. They had lower expectations of themselves from where they had been written off by others in the past because of their economic status and even in some cases their own parents had told them not to dream too big. Since my first year of teaching to my current year nine in the same district, I have noticed the similarities in the students across our district. Most of them just need a small booster to get them motivated and after they obtain a simple goal they are willing to learn anything you can throw their way. Teaching leadership to economically disadvantaged students takes some creative experiential learning and sometimes an extrinsically driven prize to get them started. An example that I noticed this year came from a community service project that District 2 in Area 3 held packing meals for Kids Against Hunger. The kids tuned me out until I told them "if you sell five wristbands and your grades are good I will get you out of school for a day to pack meals." This was part of the message that I had been telling my freshmen the entire school year to that point, but until it was worded that way they did not see the purpose. As the students actually read the wristbands which said "I fed 30 kids!" they realized this project was helping others and my minimum of five wristbands was quickly exceeded. Concerned on how I would take so many students to the event I was relieved when I told the kids that we only had a few spots available and many graciously gave up their spots to the students that sold the most. These students were truly learning from doing.

These children had realized that leadership does not have to bark out orders; instead they understood that leadership comes with give and take. They had learned that by giving opportunities to others those same people may return the favor one day if they are able. Through this same experiential learning experience they were exposed to other students that were just like them putting their leadership skills to work as group leaders and assistants to the Kids Against Hunger Administrative group. Taking the time to care about the interest of your students and being able to adapt your curriculum to their backgrounds creates more than experiential learning opportunities; it creates leaders for a better tomorrow and a better world.

R. Chris Ruscher is the Agriscience-Teacher at Davis High School, Aldine Independent School District, TX.

Assessing through Technology ***(continued from page 21)***

Every year agriculture teachers take students all over their state and our country for conventions and leadership trainings or other FFA related activities. In order to justify this travel for my school district I am in need of a grade for these students. By using the applications "Story Me" and "Book Creator" I have been able to have my students create a book of their adventures at the state capital and then take their books back and share their experiences with other students in their classes. This allows me to ensure that the themes I wanted my students to learn and become exposed to; were in fact learned because they were able to expose their classmates to the same experiences through the use of their stories.

Now I know that the thought of having an iPad for every student can be very exciting, but sometimes it is just not possible to provide every student with a device. There is a service called "poll everywhere." This service allows you, the teacher using a computer or smart phone, to set polling questions and your students can text in their answers or they can log in using a computer. This is a great tool to use at the beginning of class as a bell ringer to get things started, a quick check mid-lesson, or as a ticket out the door. This is a free service and it relies on students having their own device. One downside of this Internet poll is that students cannot share cell phones to answer questions unless you set up the poll to allow for multiple entries.

I would assert that one of the biggest barriers to integrating technology into assessment is that technology can be cost prohibitive. To overcome this barrier several school districts are moving towards a "bring your own technology" policy which allows the students and staff to bring their own devices for use in classrooms. This policy is intended to assist teachers with integrating technology. There are also grants available that allow for teachers to purchase and utilize technology in their classrooms.

Assessment does not have to be a scary term or cause stress because

we are assessing everyday as teachers. Without assessments we cannot grow because we would never know where we had been and where we can go. Assessments come in all shapes and sizes and technology expands or shrinks to fit those sizes whether it is a diagnostic, formative or summative. Whatever the tool, the standard, or the learning style we must continue to instruct, assess, analyze, instruct, assess, analyze, instruct, and the madness continues.

The SAE Struggle: ***(continued from page 24)***

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Corralling Animal Science Graduates... ***(continued from page 22)***

Once completing the undergraduate degree, students can now complete undergraduate College of Education requirements while enrolling in graduate Agricultural Education courses. Some leveling may be necessary for required undergraduate courses. Before program completion, all students must have taken coursework in animal science, agronomy, horticulture, agriculture mechanics, and agricultural economics. Since the students are required to already have an undergraduate degree in agriculture, most of these classes have already been completed. The capstone student teaching experience is then counted as a graduate internship resulting in a degree plan that spans four semesters. This gives the MS students ample opportunity to fully integrate into an Agricultural Education program as described by Lawrence and Rayfield (2011):

The programs responsible for training our up and coming teachers must reinforce the concepts of strong classroom instruction, leadership development through involvement in the National FFA Organization and strengthen our experiential learning opportunities through supervised agricultural experiences. Teacher educators must also serve as a support mechanism for new and early career teachers. Having someone to lean on or to bounce ideas or frustrations off of is sometimes the difference between continuing to teach and leaving the profession. (p. 8)

At the time of this writing, I am in my second year of graduate school, about to take my MS comprehensive exams, and will be student teaching in the spring semester. I have learned about writing lesson plans, objectives, assessments, developing an FFA program, managing student SAE projects, training a team for Career Development Events and preparing public speakers. I have attended professional development activities at the State FFA Convention, Vocational Agricultural Teachers Association of Texas Conference, and National FFA Convention. I have prepared audio/visual materials and presented lessons to my peers, instructors, and high school students.

I have not taken the most direct route to becoming a secondary agriculture teacher. However, the MS program has helped prepare me to be a leader in my profession and the teacher educators at Tarleton have prepared me to be the best agriculture teacher so that I can accomplish my ultimate goal – to serve people. Perhaps I can make a positive difference in the lives of my students through the teaching of the most important industry on the globe (agriculture) and involving young people in the finest service-oriented organization in the nation (FFA). My next goal is to prepare students to go forth into the world and “have fun and be a good helper."

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Agricultural mechanic activities during the State Career Development Event. Photo courtesy of Stacy Gartin.

A student learning basic electrical wiring skills. Photo courtesy of Jay Solomonson.

Students practicing surveying skills. Photo courtesy of Jay Solomonson.