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WHAT WE LEARN FROM RESEARCH ABOUT "TEACHING AGRICULTURE"

EDITORIAL

Learning from the Research

by Harry N. Boone, Jr.

Ary, Jacobs, Sorenson and Walker (2014) outline five sources of knowledge including experience, authority, deductive reasoning, inductive reasoning, and the scientific approach. In the first chapter of their book they outline the pros and cons of each method as a source of knowledge. Too often high school agricultural education teachers rely on experience and authority to provide information for high school programs and fail to utilize the massive amount of information that has been generated by scientific inquiry. On the other hand college agricultural educators can fall into the trap of only sharing their research findings with their peers and never adapting the results to fit the needs of the high school teachers. This issue of *The Agricultural Education Magazine* is designed to allow researchers to share their findings in a format that high school teachers can utilize.

The idea for this issue came from one of the best researchers in the profession, Dr. J. Robert Warmbrod. He suggested an issue that focused on "teaching agriculture" from a research perspective. I asked Dr. Matt Baker to coordinate these efforts as the Theme Editor. A special thanks to both of these individuals, as well as the authors who contributed their time, knowledge, and research to this issue. I hope that you enjoy the issue.

Let's move back to Ary, Jacobs, Sorenson and Walker's (2014) five sources of knowledge and start with experience. Experience is a great teacher. It is the prime characteristic of intelligent behavior. Experiences are often passed on from generation to generation. Experience, however, has its limitations. First two individuals can have different experiences in the same situation. This occurs because of the prior experiences each brings to the situation. An experienced teacher will look at the activities of a classroom in a totally different way than someone who has not been prepared as a teacher. These differences will affect the learning that occurs. While experience is a great teacher, you cannot personally experience everything that you need to know to be an effective teacher. You must rely on the experiences of others.

Authority is seeking knowledge from someone who has had the experience(s). This is good because there are some situations that you do not want to experience personally. Customs and traditions are included in the area of authority.

Once again there are disadvantages of authority as a source of knowledge. Are customs and traditions based on sound knowledge and methods? I do not remember the source but I tell the story in my research methods class about the tradition of cutting a holiday ham in a specific manner. The tradition had been passed down for several generations and no one could give any reason for the practice. Luckily they were able to ask great grandmother about the practice. The answer: the tradition was started because the pot used to cook the ham wasn't big enough.

Authorities can also be wrong. If Copernicus hadn't challenge the authorities on the rotation of the solar system, we would still be teaching that the earth is the center of the universe and everything rotates around it. Authorities can also disagree. Look at the medical profession and ask "what is the best way to treat ___ cancer" and you will get an example of authorities disagreeing.

One of the most reliable sources of knowledge is the scientific approach where researchers move inductively from observations to hypotheses and deductively from hypotheses to logical implications.

As teacher educators a portion of our time (10 - 75%) is devoted to research activities. While the profession does some good, if not great research, and shares the findings with our peers through presentations, posters, and professional journal articles, we don't always do a good job of taking the results and preparing them in a format that practitioners will utilize. Hopefully this issue of *The Agricultural Education Magazine* is another step in that direction. This issue is devoted to sharing research findings with school-based agricultural education teachers.

I would be interested in hearing your comments about this and future issues. Email me at hnboone@wvu.edu and let me know what you think.

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Enhancing the Impact of Research for the Improvement of School-Based Programs

by Matt Baker

This issue highlights knowledge generated through research and translates that knowledge into actions that school-based teachers can take to benefit your practice. As I worked closely with these authors included in this issue, I gave pause to the impact that our larger enterprise of research has had upon practice. This led me to think more deeply about how we might improve the impact of our research enterprise, and thus motivated me to place some of those ideas down in writing, which I share with you below.

First, impactful research takes time. There is a natural time lag between selecting a problem, fitting the problem into a larger body of knowledge through existing or emerging theories, collecting and analyzing data, vetting findings through our scientific community, and then pilot testing these new discoveries through field trials in school-based programs. Although there are those who would like to discover that 'magic bullet' to revolutionize instruction, the current reality is, that the process takes time, dedication, and focus. This reality is no different for our field of study, than it is in medical research, plant breeding, livestock breeding, or natural resources management.

Second, research priorities change. The agricultural sciences and natural resources issues that attract funding are social constructions that politicians and our stakeholder community deem important. Without casting judgment, and often for good reason, these priorities change over time. Issues such as food security and hunger, climate change, sustainable energy, childhood obesity, and food safety are current priorities for USDA's National Institute for Food and Agriculture (USDA-NIFA, 2012). It is common for university-based agricultural educators to participate on multidisciplinary teams addressing these issues. The great news is that participation in these projects support graduate education and often includes the development of a school-based curriculum or professional development component for school-based teachers. However, these grants seldom provide sustained funding for a focused research effort related to the long-term resolution of school-based issues. For a more comprehensive look at the scope of research in our field, I would encourage you to peruse the American Association for Agricultural Education's 2011-2015 National Research Agenda (Doerfert, 2011).

Third, more stakeholder dialogue is needed. A substantial dialogue between university- and school-based faculty and industry partners is needed for the identification of high priority school-based issues and related research priorities. Once agreed upon, there is a need to identify long-term funding strategies so that our very best and brightest scholars can focus their time and energy in contributing to solutions. Perhaps we need to reestablish a national center approach to support rigorous long-term research and translation projects. This idea is not a new one. In the early 1960's, a National Center for Advanced Study and Research in Agricultural Education was established through federal funds. Over time, the Center's focus was broadened to include career and technical education. Thus, the Center's priorities changed over time.

Fourth, we need to reexamine the preparation of researchers. A number of noted scholars in our field have called for modifications in the way in which we prepare faculty at the doctoral level (Shinn & Baker, 2010; Shinn, Briers, & Baker, 2009; Shinn, Wingenbach, Briers, Linder, & Baker, 2009). However, to improve the research skills and conceptual ability of the future professorate, perhaps our faculty preparation model should include a postdoctoral experience. According to the National Postdoctoral Association (n.d.), *"a postdoctoral scholar ("postdoc") is an individual holding a doctoral degree who is engaged in a temporary period of mentored research and/or scholarly training for the purpose of acquiring the professional skills needed to pursue a career path of his or her choosing"* (para. 1). In many fields of study, the conventional track for faculty includes a postdoctoral expectation. A rigorous research-based postdoctoral experience would add depth to our capacity to conduct high quality, impactful research.

Fifth, dollars often drive research agendas. An expectation of most university-based faculty is to generate external funding through contracts, gifts, and/or grants. In fact, as a former department chair for eight years, my expectation was that our faculty should garner at least a quarter of our annual personnel and operating expenses through external sources. Consequently, issues important to funding organizations and agencies drove our research agenda. Unless there is a significant amount

of funding provided by external sources, many university-based faculty are limited in the amount of time and resources that they have to conduct research related to school-based issues.

Sixth, our definition of scholarship needs to change. There is a growing movement encouraging the broadening of our definition of scholarship. Addressing the international agricultural and extension education community, Miller and Sandman (2002) recommended that scholarship be reconceptualized. Perhaps this reconceptualization would result in a culture of action research by school-based teachers and a greater appreciation for the way in which theory dictates field-based behaviors. According to Ary, Jacobs, & Sorensen (2010), action research is "a form of research conducted by practitioners to study a particular context and use findings to change practice . . ." (p. 636). Although school-based teachers have always been reflective in their approach to programming, Ary, et al. (2010) reminds us that action research is more than reflection. Action research "emphasizes a systematic research approach that is cyclical in nature, alternating between action and reflection, continuously refining methods and interpretations based on understandings developed in earlier cycles" (p. 513).

The National Association of Agricultural Educators does an outstanding job of encouraging the dissemination of action research. If you are not taking advantage of participation in their communities of practice, conference presentations, or submitting articles to the *Agricultural Education Magazine* – then you are missing out on a tremendous professional growth opportunity.

I want to conclude by expressing my appreciation to Dr. Harry Boone at West Virginia University for the energy that he invests in this publication, as well as the contributing authors of this particular issue. I would encourage you to follow-up with the authors who have written in areas that resonate to you. I hope that you will be inspired to reflect upon your classroom and laboratory instruction, write down your thoughts, and begin to collect information that benefits your practice of instruction. The act of recording our reflections is a powerful first step in this process. The author Joan Didion (Brainy Quote, n.d.) is noted as saying: "I write entirely to find out what I'm thinking, what I'm looking at, what I see and what it means. What I want and what I fear" (para. 1). So please, find the time to reflect, record those reflections, and then engage in substantive dialogue with the many outstanding university-based agricultural educators who desire to partner with you to improve school-based programs.

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What the Cheeseburger Studies Help Us Understand About Teaching for Agricultural Literacy

by Cary J. Trexler

Agricultural literacy is one of the hottest topics in agricultural education today. Gone are the days when the profession's focus was on producing only graduates who were narrowly trained in vocational skills. Now agricultural educators are broadening out and helping more people understand the significance of agriculture and food in daily life. As a result, the National FFA Organization has developed a new *Food for America* curriculum that is readily accessible on the web (National FFA Organization, 2012). The program is designed to help FFA members develop agricultural literacy in elementary schools and communities, while acquiring leadership skills.

This curriculum provides a rich resource for agricultural educators and will help reduce the time needed to prepare high school students to become agricultural ambassadors; however, this curriculum is more content focused and is not aligned well with the research on elementary students' understanding of the agricultural system, nor how young students learn about the system most effectively.

Our Unique Research Process

For over a decade, my graduate students and I have researched what elementary students understand about the human designed food system. Unlike most university studies in agriculture education, our research design calls for one-on-one interviews and; therefore, is a very time intensive process and our studies typically have no more than fifteen subjects in total. This is what is considered qualitative research and requires multiple studies with different groups.

We conduct the same types of interviews that Jean Piaget, you might remember him from your Educational Psychology courses, used in his seminal work on child cognitive development. Basically, we take a cheeseburger and ask the student to disassemble it into parts in any way that makes sense to them. This prop serves as a way to focus of our interviews and allows us to query students about the origin of its components by backtracking how each got to be on the burger. We then delve deeply into students understandings of a) how food was grown; b) where it may have been grown; c) how it was transported; d) what technologies were used to grow it; e) how it was processed and stored; and f) what might be the social, economic and environmental trade offs of various technologies used to produce the "parts" of the cheeseburger.

From the cheeseburger, we are able to ask questions that tap into preexisting knowledge structures of the elementary students. As you recall from your Educational Psychology courses, all students enter our classrooms with some pre-existing knowledge, some deep and fruitful, others shallow and nearly barren. By tapping into these knowledge structures or schema, we as teachers try to scaffold instruction for students to build on previous new knowledge, understandings, and skills.

What We've Found Out About Elementary Students Knowledge and Understanding

Our research on elementary students' understandings of agriculture and the food system may help you and your students to become more effective teachers and ambassadors for agriculture and the FFA. We have conducted numerous studies (the results of three are found in Table 1) that look at elementary student understandings of national science and agriculture education content standards that contribute to literacy.

Because our research looks at small groups of students, we combine findings of several studies to look for commonalities among groups. Here is what we have found out about students from Michigan, Iowa, and California.

1. Contrary to what some in the agricultural community believe, our findings indicate that urban, suburban, and rural children know that food comes from plants and animals. Not, as some people argue, simply from the grocery store.

2. Students know that farms and ranches are the places where a special group of people (farmers/ranchers) raise plants and animals that humans eat as food.

3. Most students do not comprehend the size, scale or complexity of modern farms, even if they grow up in rural Iowa. Students hold misconceptions about the structure of farms that appear to be linked to children storybooks.

4. Most children do not understand crops grown by humans compete with other plants (weeds) for basic growth requirements. Without this basic understanding at an early age it would be very difficult to weigh the costs and benefits of pesticide use or GMO crops resistant to herbicides.

5. Most children do not know where the foods they eat are grown (regionally or internationally). Without this basic knowledge, it would be difficult to understand the complexity of the food system that humans have designed and the costs associated with it.

6. Children who have the most direct experience growing food, even in a small garden, and preparing meals from raw ingredients have the richest and most complex understandings about agricultural system. School based curriculum appears to contribute little to a deep understanding of the system.

Cheeseburger Research: Contributions to High School and FFA Chapter Agricultural Literacy Efforts

Some of our findings over the years have been "no-brainers" and rather common sense in nature, while others have run counter to existing beliefs in the field of agricultural education. Probably more than anything, it is our approach, which is steeped in constructivist teaching, that may be of the greatest benefit to those of you who help your students teach others about agriculture.

Why would this be important? If one begins teaching with the knowledge that elementary students understand food comes from plants and animals and farmers grow food, then one can focus instruction on what is not understood, thereby saving time and energy. For instance, *Food for America* curriculum's *Production Agriculture: Where is agriculture?* lesson focuses on these very topics, but our research shows that there are less understood subjects within the same lesson. For instance, the lesson's reflective question "What agricultural products are grown/produced in our local area?" would contribute to what our research has found to be missing in most elementary children's understanding of production. Simply put, by reviewing the findings of our research, those teaching the lesson would be better prepared to teach by pinpointing the instruction on the topics elementary students do not understand.

If you have time, before preparing your students to teach youngsters about the agriculture and food system,

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Table 1

Findings of Three Studies of 5th Grade Elementary Students in Michigan, Iowa, and California

Year	Topic and Population	Findings
2000	Pests[1]- suburban and urban students (Michigan)	Students thought: • Modern agriculture was small in scale • Insect were pests Most students did not know: • Weeds are pests • Organisms compete for basic needs
2003	Livestock and Meat[2]- rural students (Iowa)	Students thought: • Livestock are raised on farms and ranches • Meat comes from animals Most students did not know: • Most livestock are raised on large farms ("story book" idea of a farm) • Most farms and ranches are not highly diversified
2011	Origin of Food[3] -urban students (California)	Students thought: • Food comes from plants and animals Most students did not know: • Geographic region where food was produced

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Actions Speak Louder than Words: Building Rapport and Engagement through Teacher Immediacy

by Christopher M. Estepp and Catherine W. Shoulders

Picture this: It is 6th period Animal Science and you are in the middle of delivering what you think is a high quality, engaging lesson to a group of students. But as you look away from the board and out toward the students, you notice them staring back at you in silence. The glazed- over look in their eyes tells you that your lesson is not cutting it. Immediately, you feel like Ben Stein in "*Ferris Bueller's Day Off*" saying, "Bueller?... Bueller?" You realize at that moment, changes are needed to get students reengaged or you risk losing them for the entire class!

All teachers fear these types of moments. We plan lessons carefully, making it our goal to engage students in meaningful learning experiences that are relevant to their lives. The activities, lectures, projects, and presentations we create are designed to keep students learning and interested in the subject. We get excited when our students are excited about agriculture. However, when teaching efforts fail to spur interest, curiosity, or engagement from students, one cannot help but wonder how such a well-planned lesson went so wrong. At this point, many teachers reexamine the lesson, or attribute the poor reception to poor student attitudes, and these are all appropriate reactions. However, there are other aspects outside of the lesson that have just as much weight on student engagement – teacher immediacy and rapport. Like it or not, you have a relationship with all of your students. The words you say, how you say them, your body language, and many other verbal and nonverbal attributes all play into how your students receive the messages you are sending and ultimately the type of relationship you will have with a student. Therefore, the purpose of this article is to look at teacher immediacy and rapport research and provide practical recommendations to help improve student engagement.

Studies have shown that the concepts of teacher immediacy and rapport are closely related (Estepp, 2012). Teacher immediacy includes the behaviors, both verbal and nonverbal, that help increase the perceived physical and psychological closeness between two people (Christophel, 1990), while rapport refers to the actual relationships that are built between teachers and students (Wilson, Ryan & Pugh, 2010). Immediacy has its roots in the approach-avoidance theory, which basically theorizes that people will draw closer to what they like, while they will avoid what they do not like (Mehrabian, 1981). The old adage states, "Actions speak louder than words," and early teacher immediacy research sought to examine how this affects teacher effectiveness. Results showed that as much as 82% of teachers' behaviors are nonverbal (Andersen, 1978). This means that what you "don't say" can have as much bearing in the classroom as your words. Examples of nonverbal immediacy behaviors include eye contact, smiling, nodding, relaxed body position, leaning toward students while listening, movement around the classroom, and gesturing. Later immediacy studies added the verbal component of immediacy. Velez (2008) stated that "Verbal teacher immediacy refers directly to stylistic verbal expressions used by teachers to develop within students a degree of like or dislike towards the teacher" (p. 42). Examples of verbal immediacy behaviors include praising students' efforts, using humor in teaching, engaging in conversations with students before or after class, willingness to interact with students, and use of personal stories and examples in teaching.

Because immediacy behaviors can help draw students toward the teacher, researchers who study rapport believe that teacher immediacy is one stepping stone to building relationships with students. Wilson et al., (2010) reported that teacher immediacy deals strictly with behaviors that teachers can utilize in the classroom to increase the closeness between teacher and student, but does not encompass all of the details involved in interpersonal relationships. Things that instructors can do in the classroom to help build better rapport include being friendly to students, being approachable, mentoring students, respecting students, keeping open lines of communication with students, being enthusiastic, caring for students, being fair with students, and being a positive role model.

Research has shown that both immediacy and rapport have many positive effects on student attitudes and behaviors. While most of the research examining immediacy and rapport has been conducted with college students, these results can likely be generalized to younger students. This is because the idea of approach-avoidance is noticeable in people even at an early age. For instance, young children react positively to pleasant experiences, while they avoid unpleasant ones. In the

classroom, verbal and nonverbal *immediacy* has been associated with an increase in students' motivation, expectations to do well in a class, value that the students have for a class, goal setting by students, better attitudes toward instructors, better attitudes toward classes and subjects, greater classroom engagement, and higher levels of achievement. Likewise, better *rapport* between instructors and students has shown to predict increases in students' motivation, expectations to do well, enjoyment and satisfaction with a class, attitudes toward instructors, class attendance, engagement in classroom activities, intellectual growth, and achievement.

In light of this, we propose the following list of recommendations on how to better utilize teacher immediacy and build rapport in your classroom. While many of these recommendations may seem basic, the cumulative effects of applying them in your class can pay dividends in increasing students' motivation and engagement in learning.

- *Use personal examples or experiences in your teaching.* Stories you tell can come from television, books, and friends. These examples help students get to know you as a person, as well as give them a visual to remember the topic.
- *Ask questions that encourage students to engage in discussions.* When students are discussing, they are sharing their own viewpoints and establishing a classroom culture that involves all students.
- *Get into discussions based on student questions, even when they are not part of your lesson plan.* These tangents give insight into the interests of your students, as well as show the students that you value their thoughts. This shows students you are interested in teaching them what they want to learn in addition to what's in the lesson.
- *Use humor in your teaching.* Do not worry if your personality is more on the dry side. You do not have to be a comedian. Utilize movie clips, songs, and student experiences to display that humor is a valued component to the classroom culture.
- *Smile and laugh in class.* When students see you enjoying what you are doing in class, they will follow suit and engage in these behaviors as well. Personally, we have found that if we put on a smile, even when we do not feel like it, students are more receptive to learning. Typically before the end of the class, the students have helped turn our moods around without them even knowing it!
- *Address all students by name.* Teachers have different tricks for remembering students' names as soon as possible. Whatever your method is, make sure this is a priority for you each time you begin a new year.
- *Have conversations with your students outside of class time.* Oftentimes conversations outside of class can spill into class, improving the learning and culture during formal learning experiences. Informal conversations do not have to be school related; they can give insight into students' background experiences, which can be referred to when introducing new subjects in the classroom.
- *Ask how students feel about an assignment, due date or discussion topic.* Showing students that you are willing to adjust components of the class based on their feelings lets them know that you are more interested in their learning than you are in your teaching. Gauging students' feelings about assignments or topics also allows you to learn what else students have on their minds that could be impacting their learning.
- *Move around the class while teaching.* Deconstructing the invisible wall between the student section and the teacher section of a classroom can increase student participation and reduce student distraction. Students also begin to realize that there are no "hiding places" in the classroom, so misbehaving is no easier in the back of the room than it is in the front.
- *Use a variety of vocal expressions and gestures while teaching.* Students, and the rest of us, use vocal inflection, expressions, and gestures in our informal discussions with friends. Giving your lectures more of a conversational feel can help maintain students' interests during lengthy periods of passive listening.

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Preparing Mentor Teachers to Ensure the Future of Effective Agriculture Teachers

by Ryan M. Foor

When I taught high school agriculture, I never imagined I would go to graduate school full time to pursue a doctoral degree. One of my goals was to get a master's degree and I figured I would accomplish that goal while teaching. When the opportunity came to go to Ohio State to pursue both degrees, I had no idea about research. I did not know what research was or how to conduct a study. I quickly learned the process and discovered one of my research interest areas related to teacher mentoring and induction.

I mentioned in a previous article of *The Agricultural Education Magazine* titled, "Serve as a Principle-Centered Individual" that I was not a good teacher my first year. However, I feel that in the five years I spent in the classroom, I got better each semester. There were many times my first year when I looked for different jobs, including teaching different subjects. One of the major reasons I continued teaching high school agriculture was because of the great support system I had in my mentors, including my cooperating teacher from my student teaching experience, Tom Paulsen, who is now a faculty member at Iowa State University. Tom is a documented master teacher, and that definition goes beyond teaching high school students, it includes serving as a cooperating teacher mentor, and now as a teacher educator. Tom's belief in me as a future agriculture teacher is one of the principle reasons I continued to teach. He knew I could do it, and he passed that confidence to me. I attribute my interest in studying teacher mentoring and induction to my great mentors, like Tom, so that I could discover ways for other pre-service and new teachers to have positive experiences like I did.

In addition to my positive personal experiences, I learned another important reason for mentoring is related to the fact so many new teachers leave the profession within the first three to five years. In fact, some studies tell us that up to half of new teachers leave within the first five years (Ingersoll, 2001; Ingersoll & Smith, 2003). Immediately, this creates two problems: (a) a lack of experienced teachers, and (b) a lack of experienced mentors. Further, this second problem is twofold; for one, if new teachers are leaving through a revolving door, mentor teachers are not getting enough experience to guide new teachers through the entire induction process. Second, there are fewer new teachers sustaining in the profession who could one day become mentor teachers. So, I want to know a lot of things about mentors and the mentoring process, and one of the questions I have is, "How do mentor teachers perceive their ability to mentor and what do they believe about mentoring?" In a recent study I conducted among agriculture teachers in Ohio who served as cooperating teachers, I found some answers to my question (Foor & Cano, 2012).

Regarding the ability to mentor, I discovered that the teachers in the study were very confident with their ability to help new teachers with many teaching profession-related tasks like demonstrate professionalism, assess student achievement, become more responsive when working with students, communicate clearly with students, and design coherent instruction. On the other hand, some of these teachers were not as confident with their ability to help new teachers with some of the following teaching profession-related tasks:

- Become more knowledgeable about pedagogy
- Become more knowledgeable about subject matter content
- Engage students in learning processes
- Maintain accurate academic records.

This lack of confidence does not represent the majority (most teachers were confident with all tasks), but we are able to see in the above items some opportunities for mentor teachers to improve. Granted, a mentor teacher cannot do it all; teacher preparation programs should be responsible for the majority of preparation, but much like in our secondary programs, students learn most by doing. Student teaching is like the Supervised Agricultural Experience program of a teacher preparation program and our cooperating teachers are an extension of the teacher preparation faculty and should be prepared to counsel pre-service teachers on myriad aspects of the role of teacher.

The second part of my question is related to mentor teachers' beliefs about mentoring. I asked teachers to rate their agreement with statements like:

- I believe in the importance of guiding novice teachers
- I am accepting of novice teachers

- I express an interest in the professional well-being of novice teachers
- I view the mentoring process as a continuous relationship
- I work to build trust in the mentoring relationship

With all 13 statements, mentor teachers strongly agreed or very strongly agreed with the items. There were, however, two items where teachers reported disagreement: (a) I am skilled at providing instructional support for novice teachers, and (b) I share myself emotionally with novice teachers. The statement that concerned me the most is the latter; seven teachers out of 56 (about 13%) reported some level of disagreement with this statement. While many people may believe that "leaving emotions out of it" is important in the workplace, I believe this is impossible. A report on mentor teacher programs from 1990 (Odell) stated that emotional support was one of the most helpful factors for novice teachers. We have to remember that we are dealing with people; mentor teachers are in a great position to provide support to pre-service and new teachers.

Two major aspects of this research study stand out for us to consider; first that there is opportunity for mentor professional development related to mentoring abilities. Second, mentors' beliefs should be considered when selecting and training mentors. Both of these considerations relate to the training of mentors. I think that mentor training is often an afterthought; because someone is a great teacher does not mean they will be a great mentor. Also, I believe mentoring is critically important for career and technical education (CTE) teachers, especially agriculture teachers; even more so than for other teachers. Think about all of the demands on agriculture teachers. Agriculture teachers are more than teachers, they are program managers. Teacher is only one of the roles as program manager, others being FFA advisor and SAE supervisor. In order to grow successful program managers, we must grow effective mentors from within our ranks.

Effective mentors must have first-class professional development opportunities to help guide new teachers in the profession, but not every mentor is the same and this was evident in my study. People possess differing abilities and beliefs and we must recognize those differences when preparing mentors to work with different types of people. I think the responsibility for the professional development of mentor teachers lies with two groups. Teacher preparation units should be responsible for purposeful training of cooperating teachers. To prepare mentors for new teachers, the teacher preparation units in a state, along with the agriculture teachers' association should work to develop formal and purposeful mentor training programs that recognize differences among mentor teachers in order to cater to the differing needs of pre-service and new teachers.

We face many educational challenges in 2013 at the local, state, and national levels. Sometimes those challenges seem compounded in career and technical education. I think we can work to overcome many of these challenges when we recognize that we must keep good teachers in the classroom. Then, we must groom those good teachers to be good mentors to keep the cycle going. We cannot take for granted that good teachers will know how to be good mentors. We must step up to make a difference in the preparation of mentor teachers for Agricultural Education. Many school districts have highly regarded mentoring programs, but when new agriculture teachers are assigned a mentor in the local school, the mentor teacher is often not an agriculture (or CTE) teacher. These mentors may not recognize the challenges of new agriculture program managers. To that end, we must make sure that we, as teacher leaders, step up to effect change and make a difference with regard to teacher mentoring in order to make sure that someone like you will be reading *The Agricultural Education Magazine* in 50 years.

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Inspiring Technology use through Research: iPods™ in the Agriculture Classroom

by Kimberley A Miller

Albert Einstein once said "If we knew what it was we were doing, it would not be called research, would it?" (Brainy Quote, n.d.). Research is important to everyone. It is the reason why products that we use are created, why items we enjoy remain available or disappear for good, and why other items are continually changing, mostly for the better. Most everything we do in life is researched one way or another, from the way we shop to the way we search the Internet to what our tastes are in music and media. Although sometimes perceived as daunting to read by some, it is true that research is important because it does, in fact, help us understand what to do next.

I remember the first research article I read as a graduate student, saying out loud, to no one in particular, "Who thinks like this? What do I care if 51% of all people participating in a survey strongly agreed with statement "A"? I just want to know what to do with the information." What I quickly learned through my graduate program is that prior knowledge summaries, new data, conclusions and recommendations that result from research is often useful, eye-opening and practical. More importantly, for the agricultural science teacher, it can enhance a classroom or lesson plan when the information from the research is utilized to the advantage of teachers and their students.

The data collection and research coordination process had already begun when I was exposed to a research project about Texas teacher perspectives on and about use of iPods™. The inspiration for my interest was based upon a personal purchase of an iPod™ that I had made just prior to enrolling in the course and a faculty member with whom I was working.

> Teachers should be inspired to seek out new ideas and create new ways for their students to learn.

I was teaching high school agriculture at the time so I talked with my students about iTunes™ and used my iPod™ to enhance lessons with podcasts to add that "something extra" to my classroom. My personal experiences with this amazing device helped enhance my ability to relate to the information being collected from the teachers in the study and, in turn, I found extensive educational value in the results.

What surfaced from the data collection was two separate research papers, one that examined the use of iPods™ by teachers in Texas (Murphrey, Miller, & Roberts, 2009) and one that examined the perceptions of Texas agricultural science teachers regarding the use of iPods™ for classroom and co-curricular activities (Murphrey, Miller, & Roberts, 2009). Although these papers were published three years ago and did only include agricultural science teachers in Texas, the general findings of both studies offer powerful arguments and inspirations for iPod™ use in agricultural education at all levels. The beauty of technology is that it continues to build on what has already been developed and, like a fine wine, improves with age and time. The suggestions listed here not only apply to iPods™, but now are translational to iPads™, tablets and iPhones™.

iPod™ Inspiration #1

Keep calm and iPod on: According to the data collected, agricultural science teachers were interested in learning more about iPods™ and were familiar with student use of iPods™. This information alone is pivotal in understanding that iPods™ can be used in viable ways in the agricultural science classroom. For those who are just starting out using iPod™ technology, ask students to download video podcasts to their iPods™ and have them watch them in small groups or as homework. For the iPod™-owning teacher, download videos or talk-show style podcasts and play them in class using external speakers and/or a LCD projector. Teachers who may be unfamiliar with iTunes™ will be pleasantly surprised at the appropriateness of the free media available and how easy it is to enhance a lesson by selecting from millions of video clips and podcasts. iPods™ can also be used to download and convert YouTube™ and other website videos, using software like RealPlayer™, eliminating the constant need for an Internet connection

and therefore making the use of video clips or other media more convenient.

Another point teachers have made is their inclination to use iPods™ if downloadable materials were readily available. Although iTunes™ offers an extensive variety of materials, some custom work may be more valuable. For the more advanced user of iPods™, iTunes™, and podcasts teachers should try creating their own podcasts or ask students to create them, assigning different subject matter. By creating their own podcasts and videos, a teacher can ensure that the information contained in a video or podcast is appropriate to their lesson. Through contributing in the creation of class podcasts, students are better able to buy-in to their studies. After a short while, a teacher could very well have a solid collection of custom media clips to utilize regularly.

iPod™ Inspiration #2

Contest preparation: That was easy*:* Career Development Events (CDE) and Leadership Development Events (LDE) are integral parts of agricultural science classrooms, but training is extensive and time consuming. It has been noted by teachers that iPods™ have the potential to greatly enhance a coach's and members' abilities to prepare for CDEs and LDEs. Identification slides, sample judging classes, nomenclature appropriate for the contest, and so much more can be uploaded to an iPod™ for mobile access. Students can study on the go and on their own time, making face-to-face practice time more efficient. Study materials created for specific contests can also be edited as curricular codes and rules change or as updated digital images become available. iPods™ and podcasts can enhance public speaking preparation when a student or teacher creates a narrative of say, the FFA Creed. The student can listen to the creed on their iPad™ and expedite the time it takes to memorize the creed, thereby spending more time learning the meaning behind the words. iPod™ use in enhancing contest preparation really knows no bounds.

iPod™ Inspiration #3

When they're out, there's no doubt: When teachers were given the opportunity to answer open-ended questions about iPod™ and iTunes™ use, many stated that iPods™ would be a great way to keep students up-to-date on their studies. Lectures could be recorded or PowerPoints™ posted for upload to iPods™. If students are unable to be in class, agricultural science teachers can ask other students to create podcasts of the class, submit the podcasts for extra credit, and then make it available to those students who were unable to attend. Since the completion of the iPod™ research referenced previously, textbooks are now readily available for viewing on iPods™ and iPads™, streamlining the ability to deliver course materials to students who are away. Now, no student has to remain "out of the loop" for an extended period of time.

iPod™Inspiration #4

Be and stay inspired: An important barrier to note was that some of the Texas teachers had not utilized iPod™ technology in their classrooms because of either financial or time constraints. While understanding that education is continually faced with resource challenges, agricultural science teachers should continue to seek out specialized funding opportunities, participate in discussions with program boosters and advisory board members, and continue an open dialog with administrators about the benefits of using mobile technology. Often times, districts qualify for quantity discounts with technology companies and are simply waiting for the right teacher with the right idea to take advantage of special offers. Conversations about and demonstrations of the effectiveness and potential use of mobile technology to stakeholders can pay large dividends.

When it comes to learning this technology, work with your administration and offer ideas for in-service training, summer internship programs, and/or seek out off-campus training programs designed for teachers. Administrators appreciate innovative teachers willing to invest in instructional improvement. With the speed at which these technologies are changing and the convenience of the Internet, self-teaching tools are also available to streamline the learning process.

Concluding Inspiration - The Gift of Continual Improvement

We are fortunate as agricultural science teachers to have the ability to continually improve our instruction. Research projects, when deciphered appropriately for individual use, can be a powerful ally in our quest for student engagement and active participation. Teachers should be inspired to seek out new ideas and create new ways for their students to learn, and iPod™, iPad™ and iTunes™ technology might be just the ticket. After all, it was also Albert Einstein who said, "Teaching should be such that what is offered is perceived as a valuable gift and not as a hard duty" (Good Reads, n.d.).

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What the Cheeseburger Studies... ***(continued from page 7)***

maybe take a look at our research in the *Journal of Agricultural Education*. You may find that some types of research really do have direct links to your job of teaching others about agriculture. From our research, we have come up with road map of sorts that illustrates the learning progression needed to understand why humans have chosen to use a certain technology - pesticides - in the production of food. Many of these topics are basic elementary science and social science concepts, others are typically taught in middle and high school.

To understand why humans use pesticides (organic or inorganic) on plant crops one must understand that:

1. Humans are animals that compete for food with other animals, e.g., insects, rodents, etc.; (elementary school)
2. Animals have growth requirements (food, water, shelter, air, space); (elementary school)
3. Growth requirements are in limited supply; (elementary school)
4. Humans select certain plants to grow for food; (elementary school)
5. Plants that humans grow can be food for competitors; (elementary or middle school)
6. Humans, to control animals that destroy their food, employ technologies that kill them, limit their number, or prevent them from reaching the crop; and (middle school)
7. Humans must weigh trade-offs of using technologies--such as pesticides--in regard to health and safety, and the environment. (middle or high school)

A Final Thought

For me, our ultimate job as people who teach others "about" agriculture is to contribute to our citizenry's ability to enter into discourse about how we want food produced and make decisions in response to choices facing society. This is a difficult process and requires students to incrementally learn about the food system over the course of their lives. The process should begin when students are young and we are blessed to be able to contribute to the way our society chooses to shape the Earth.

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I am an Agricultural Educator by Choice and not by Chance

by Nina Crutchfield

The realists will tell you research shows that we can expect to lose between 50 and 80 % of early career teachers (National Commission on Teaching and America's Future, 2003). They will tell you that the teaching profession has a turnover rate that out paces nearly all other professions (Ingersoll, 2003). There is an even longer list of studies that identify every factor that causes teachers to seek another career.

Despite increasing demands and conflicts created by professional expectations and personal life pressures, the reality is that agricultural educators do make the choice to continue teaching, learning, and impacting young people. I propose that the reasons to stay go a lot deeper and wider than any list outlining attrition. First, let us examine the reasons we are agricultural educators by choice, not by chance, and then how we can use that knowledge to increase the number of retained agricultural educators in the years to come.

Professional Life Phase

A researcher named Christopher Day (2008) conducted a multi-year study of teachers that identified stages of the educators' professional career. From the information presented in Table 1, it is possible to quickly identify which phase you fall into or in which phase you may be an outlier (you fit into the phase but not the description).

What does all that mean and how can we use that to retain teachers? To borrow a catch phrase from my generation's Saturday morning cartoons "Knowing is half the battle." Knowing what professional life phase you fall into will help you 1) feel less alone as you manage your roles as teacher, spouse, parent, etc., and 2) understand that collectively our careers do follow a pattern of motivation and engagement. At a summer conference, I once observed the power of teachers discussing these phases with each other in relationship to their experiences. After the teachers grouped themselves into these phases, they then deeply discussed the issues they were facing, while sharing ideas and strategies. It was great to see every emotion from relief to hilarious laughter, from sympathy to shared anger. It was obvious the teachers felt better just knowing that others were experiencing the same trials and victories they were, enjoying the opportunity to one-up each other's stories. They benefited from a shared sense of community based on their professional life phase.

Work-Life Balance

The professional life phase descriptions allude to conflicts of work

Table 1
Professional Life Phases and Characteristics of Teachers

Professional Life Phases (Day, 2008)	**Characteristics of the Phase**
Early induction, 0-3 years	Developing efficacy, requires high degree of commitment
Induction, 4-7 years	Characterized by increased confidence, development of identity as an educator, and acceptance of their workload
Early, 8-15 years	Managing roles and identity in their professional and personal lives, sustained engagement, making decisions about progression of their career
Mid, 16-23 years	Experiencing challenges with motivation and commitment, fighting professional stagnation, managing heavy workloads, facing increased demands in their personal lives, and making work-life balance a focus
Late, 24-30 years	Most challenging period for sustaining motivation, most are holding on but losing motivation
Sunset, 31 + years	High commitment or are looking to retire but are trapped
Note: Day (2008) identified the phases by the number of years of experience. The author of this article added names to the phases for ease of identification.	

with our personal lives. Anyone who has gotten married, had children, gone to graduate school, or cared for ailing family members will say that there is stress created when our commitment to our personal life slams into our career. Creating work-life balance refers to one's ability to manage the conflict between the pressures of work and family roles. Any conflict, whether it is work intruding on personal roles or personal issues overriding work duties, can negatively impact the decision to continue teaching. Dr. Day (2008) stated that teachers' personal lives are intimately linked to their professional lives. It is no secret that agricultural educators have always experienced this overlap. I have heard stories of spouses bringing supper and children to the agricultural sciences building so the family could spend time together while the teacher supervised CDE practices or made livestock show preparations. There are many teachers who see their family only at bedtime because they are gone before the children get up in the morning and return late into the evening.

The good news is that as we gain experience we develop skills and appreciation for making accommodations in our work and personal roles to reduce the conflict. Many teachers are not satisfied with the conflict and take steps to reduce it. They limit the number of CDE teams they train, get parents and alumni to assume more duties for preparation and hauling of livestock, or put a time limit on how late they stay after school. As a profession we are becoming more aware of the negative impact of our career consuming every waking hour. While we are fortunate that our job also happens to be our hobby, we must guard against it taking over to the point that it harms us and our personal relationships.

> Find a work-life balance will actually increase our commitment to remain in the profession.

Engagement

Many of us do love our job because we love agriculture and we love young people. We love to see the success of growing and producing plants in the greenhouse, livestock in the barn, and projects in the agricultural mechanics laboratories. More importantly we love growing young people who will be successful no matter what they do in life. This is what really keeps us engaged. When an individual is engaged in their work they experience fulfillment. They feel invigorated, dedicated, and absorbed in the tasks associated with their work (Schaufeli, Bakker, & Salanova, 2006). Engaged teachers have a sense of energy, are connected to their work, and see themselves dealing well with day-to-day demands.

Now I invite you to a complete a short instrument to gauge your professional engagement. While at work do you:

a) feel bursting with energy?

b) find meaning and purpose?

c) find that time flies?

d) feel strong and vigorous?

e) feel enthusiastic?

f) find yourself consumed by tasks?

g) feel inspired?

h) find challenges rather than obstacles?

i) find it difficult to detach yourself at the end of the day?

j) persevere even when things do not go well?

k) take pride in your efforts?

While you had varying degrees of affirmation or nullification on each item, I suspect that collectively you answered in an affirmative manner. This goes back to the fact that agricultural educators love the industry they teach about and the students they teach it to. It is our hobby and our profession. If you found yourself answering negatively to the majority of the questions, it may be time for a recharge. I would encourage you to really take a good look at your work-life balance. Determine if there are unrecognized conflicts and develop a plan to address them so that your personal life and work engagement are in harmony.

Commitment

That degree of harmony between our personal and professional lives impacts our commitment to continue in the classroom (Crutchfield, 2010). Commitment is an outward expression of psychological attachment to one's profession, motivation, willingness to learn, and belief an individual can make a difference in the learning and achievement of students (Sammons et al., 2007).

In casual conversation I love to ask agricultural educators "Why do

you continue to teach?" The most common responses I receive are "I love kids," "I feel called to the profession," "I love the industry of agriculture," "Ag Ed made a difference in my life and I can see the difference it makes in the lives of my students." Based on these responses, I would speculate that there is a visceral reason agricultural educators continue in the profession. The emotional investment often overrides many of the daily discouragements that can degrade professional commitment.

While we all ride the roller coaster of district paperwork, committee assignments, lunch duty, bus driving, parent/teacher conferences, special education requirements, working beyond the school day, inadequate salary, and all the other not-so-great aspects of working for a public institution; we keep coming back to the reasons we chose this profession in the first place. We love kids and we love agriculture. These are the two things that sustain us.

Retaining Teachers

How can we use the knowledge of professional life phases, work-life balance, engagement, and commitment to retain agricultural educators? As a profession, we need to provide support for each factor.

Consider replicating the professional life phase break-out session at your summer conference to give teachers the chance to find laughter, sympathy, and coping strategies from their colleagues. Perhaps an evening get-together for each professional phase group is more aligned with your colleagues' needs. Getting all the teachers together with 8-15 years or 16-23 years in the classroom might just provide a setting for reenergizing teachers so they can go the distance.

When it comes to work-life balance, teacher leaders will have to get a bit more creative. Perhaps it is time to look at providing child care at FFA events, change meeting locations to be near family- oriented activities, or host meetings virtually. A number of states have adopted the practice of holding all their FFA CDEs on the same day, in the same location. Yes, it does limit the number of events which students are able to compete in, however it ultimately may increase engagement of more FFA members. Yes, it can be a bit of a logistical nightmare with that many students in one location and that many people involved in conducting events. Yes, it means that rather than giving up five of your Saturdays to CDE events, now you only have to sacrifice family time for one day. It is time to start finding ways to reduce conflicts created when personal lives slam into our careers.

Helping each other to find balance will actually increase our engagement and ultimately our commitment to remain in the profession. Rather than feeling like we are sacrificing, we will start to feel value in separating the time we spend engaged in work versus engaged in personal roles. We will continue to be agricultural educators by choice, sharing the industry we love with the students we love.

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Teaching Digital Natives: Is There an App For That?

by Candis Carraway and Scott Burris

Anyone who has taught over the past ten or more years can testify that students are evolving. These changes are obvious in their attire, the music they listen to, and what they do during their spare time. However, the most prevalent advancements have occurred through use of technological gadgets. Being of an older generation this progress may not make sense, but we cannot deny it is happening.

Today's students are attached to their technological devices.

Shortly after the turn of the century, Marc Prensky (2001) introduced the terms "digital natives" and "digital immigrants." He described "digital natives" as those who have been immersed in technology all their lives. Conversely, "digital immigrants" did not grow up with technology. He suggested that the division between these two groups occurred in 1980, meaning those born after 1980 are considered "digital natives." Of course there are exceptions to this rule but for the most part people who were born after 1980 have always been exposed to a variety of technology. Just as technology advances and becomes more readily available each year, the more accustomed to technology the younger generations arrive in our classrooms. For example, someone born in 2004 is much more dependent on technology than someone born in 1984, although they are both considered "digital natives." (Prensky, 2001)

After Prensky introduced these terms in 2001, many critics refuted the claim that "digital natives" learned differently and cited a lack of empirical evidence to support the claim. This led Prensky to publish *The Emerging Online Life of the Digital Native: What They do Differently because of Technology and How They do It* (2004). In this article he revealed the results of a 2004 study of 200,000 U.S. students. The study concluded that "students are not just using technology differently today, but are approaching their life and their daily activities differently because of the technology" (Prensky, 2004, p. 1). If you do not think this statement is true, just think about how your life would change without your cell phone, much less the absence of all technology. We would venture to guess the older you are, the more capable of adjusting to the loss of your cell phone you would be.

So what does this study tell us about how technology has changed today's students? One obvious change that is easy to see is in the way students communicate. Land–line phones have been replaced with cell phones, which are used more to communicate through texts and social media than by actual phone conversations. The letter written on paper has been replaced by e-mails. Not to mention the addition of instant messaging, blogs, twitter, and many other technologies the "digital natives" use to communicate. Presnsky's work also pointed out that technology has changed the way people buy and sell items, exchange information and belongings, hold meetings, coordinate with others, and evaluate information. According to Prensky, the biggest use of the Internet is now for searching. Younger generations are more adept at and very willing to create web sites, flash movies and other online creations. Even the way people learn is different (Prensky, 2004).

What does this mean to us as agricultural science teachers? First, it means we have to adopt some of these technological forms of communication to effectively communicate with our students. We must also realize that many of these students have not been taught how to professionally use these forms of communications and desperately need instruction in this area. There is a growing need to educate students about the etiquette of cell phones, texting, and e-mails. We should also make them aware that anything they post to a social media site is a reflection of them and will be available for possible employers to see. Furthermore, it is even more important that we teach our students how to communicate face-to-face with people, as well as giving them ample opportunities to practice. They need to realize that many people they will work with in the future (especially in the food and agricultural industry) will be "digital immigrants." They also must learn to communicate professionally with individuals in supervisory roles, co-workers, and clients/customers.

How do we utilize technology in communicating with and teaching our students? As "digital natives" and "digital immigrants" collide right in our own classrooms, there arises a growing need for researchers to explore this collision. The research literature already highlights some emerging practices being utilized at the post-secondary level. College professors have been experimenting with the use of *SecondLife* in learning situations, as well as incorporating different forms of social media into the instructional process. Though the currently published research is limited, more and more research about the use of technology in secondary and post-secondary agricultural education will emerge as more data are gathered.

Whether we like it or not, our students are attached to their technological devices, so why not find ways to use this technology to engage students in learning? Many of us have already transitioned to electronic record books. Can you remember how much easier it was to get your students to actually complete their record books when they could fill them out on a computer rather than a hard copy? Did you notice they were eager to work on the same thing they dreaded before just because they could work on the computer?

Finding other ways to utilize technology in your classroom can have the same results. Instead of experiencing conflict about student use of technology, find ways for students to use technology for educational purposes. For example, have students look up information on their phones to add to class discussions or utilize *Poll Everywhere* to obtain feedback from your students in class. If all of your students have access to computers you might want to look into *Edmodo* as an instructional tool. Possibly, instead of having students write a paper, you have them create a blog. In place of a physical presentation with a poster, they can create a digital video. Maybe you can use *Remind101* to communicate with your students more effectively. Perhaps you can create podcasts that allow students to see activities they cannot see in the classroom. The possibilities are endless. There are already many applications and tools available and more are being created daily, allowing us to incorporate technology into the learning process. There's an app for that!

- *Secondlife – Secondlife* is a virtual reality platform where students can apply solutions to real life scenarios in a "video game-like" setting. www.secondlife.com.
- *Poll Everywhere* – Poll Everywhere is a texting applications where students can text answers to a number and they will appear directly on screen/presentation. www.polleverywhere.com
- *Edmodo – Edmodo* is a social networking site dedicated to academic interactions. Subscriptions are free to classroom teachers and students. www.edmodo.com
- *Remind 101 – Remind 101* is a texting tool where students can sign up for text alerts. When the teacher sends a text, everyone who has signed up receives the message. www.remind101.com

By now, most "digital immigrants" either stopped reading this article or are feeling a little overwhelmed. For those of you who are still interested, take a deep breath. Begin one step at a time. Find another teacher who is utilizing technology and learn from this individual. If you cannot find someone to help you, look on the Internet (you can learn things there too) or speak with your district's technology specialist. If all else fails ask one of your students to teach for a change. Start with just one new strategy that involves technology. When you have mastered that technique add a new technology or application - then witness the growing excitement and success of your students.

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Working With Children With Special Needs In 4-H And FFA: Tips For Success

by Kristin Stair

I will never forget the first time I realized how many students in my program had special needs. I had been teaching for weeks in my first teaching position, I was already stressed out and struggling to be successful with lesson planning and meeting the requirements of my school system. One afternoon, a case manager stopped by during my planning period and presented me with a stack of Individual Education Plans (IEPs). These documents summarized the needs and the recommended accommodations of several students in my classroom. I was shocked by how many there were, I had no idea! Trying to figure out how to adequately address these needs with limited time and resources was overwhelming and frustrating. All I could think of was "how in the world am I supposed to effectively work with such a diverse group of learners?"

Research indicates as many as 13% of children enrolled in school have a disability. With such a large number of children being identified as individuals with a disability, it is important that clubs such as 4-H and FFA have strategies in place to work effectively with this student population and provide them with appropriate resources. Teachers and agents also need to feel comfortable working with a variety of learners who may have a wide variety of needs. The term disability is often used interchangeably with terms such as "special needs." These terms are used to identify 5.5 million children in the United States fall under one of several recognized categories of disabilities.

According to the Individuals with Disabilities in Education Act, a disability is defined as "having (i) hearing impairments (including deafness), speech or language impairments, visual impairments (including blindness), serious emotional disturbance (hereinafter referred to as 'emotional disturbance'), orthopedic impairments, autism, traumatic brain injury, other health impairments, or specific learning disabilities; and (ii) who, by reason thereof, needs special education and related services" (*Individuals with Disabilities Education Act*, 1997, pg 7).

I am not the only one who has felt overwhelmed when faced with the task of working with children with special needs. Research conducted with 4-H agents who are members of the Extension professional organization the NAEA4-HA found there are numerous obstacles when working with youth with special needs. Some of the most common challenges of working with special needs were:

- Time
- Training staff and volunteers
- Developing appropriate programs
- Identifying the needs of children
- Working with families
- Finding or Identifying Resources

In a similar study conducted in 2010, agricultural education teachers were asked if they believed they were adequately prepared to work with children with special needs (Stair, Moore, Wilson, Croom, & Jayaratne, 2010). Overall, 52% of the teachers disagreed or strongly disagreed they had received adequate training or education to work with these learners. So how do we overcome the stress and challenges to begin to work more successfully with these children?

Research conducted with 4-H agents and agriculture teachers has summarized several successful strategies that they use when working with children with special needs. Below are 10 identified strategies, along with hints and tips agricultural education professionals have shared to incorporate these strategies in their programs.

Working Closely With Parents

Parents can be our best partners! They are knowledgeable about the needs of their children and are often willing to help problem-solve ways to help their children succeed. Consider scheduling a meeting with parents at the beginning of the semester or at the start of a project or activity to discuss the specific needs and ways to work productively and to eliminate potential behavior issues. They may also be willing to act as volunteers and assist with your entire program.

Preferential Seating

Preferential may mean placing students in specific seats to give them the opportunity to see presentations better or it may mean placing students in seats to limit distractions. Have a discussion with children and parents or guardians to determine where they may be most comfortable and productive. Children with autism or attention problems often have a very difficult time with noise or lights, so seating them in a quiet part of the room will help improve focus and allow students to participate more than if they are in a louder and more chaotic location.

Curriculum Modifications

Contest materials, project books, and contest resources are often written to a specific level of learner. That curriculum may need to be modified depending on individual needs. Consider contacting additional resources such as your state Ag in the Classroom Director who may have access to agriculture curriculum at a more basic level. 4-H project books for younger children may be an ideal fit for an older child with a severe disability or for an FFA member trying to learn more about a specific topic or contest. Large print and braille textbooks are also available through national lending libraries and textbook companies for use in your programs.

Additional Volunteer Help

Most teachers and agents agree having more help for working individually with children with special needs is one of the best resources. Volunteers can help work with your larger group so you can work individually with a learner with special needs OR they can provide additional resources for a child with special needs. In each school system, there are case managers and special education teachers who are knowledgeable about the specific needs of children and can provide exceptional resources and strategies for you to use. Teachers can work with these individuals directly and 4-H agents can contact these professionals for general help and guidance in developing program activities.

Modified Assignments And Testing

Depending on the specific needs of children, it may be necessary to directly modify assignments or tests. If you are a teacher and have access to a student's IEP, then the modifications are clearly listed in that student's paperwork though you may have to request the entire document from your school. 4-H agents should discuss testing modifications with parents and guardians to determine specific needs. These modifications can also be applied to both state and national contests if enough notice is given to the state office. So for example, if a child needs a test or assignment to be read to them and you notify the state office of this need, then a written test can be read aloud by a volunteer or official at the state contest.

Working One On One

Individual work with learners can be difficult with limited time and resources. Consider ways you can carve out small amounts of time to work directly with learners with special needs. Other children may be able teach each other during parts of practice or meeting so you have time to work independently with others, or parents and volunteers may be able to come help work with a specific child.

Emphasizing Hands On Options Whenever Possible

This strategy is easy for FFA and 4-H! Children with special needs often have difficulty with abstract or difficult concepts but by including hands on skills into our programs we make difficult concepts easier to understand and make learning more fun! Soil texturing for example, can be taught many different ways, but by allowing children to actually use their hands and feel the soil they get a much more memorable learning experience.

Visual And Auditory Modifications

There is a wide range of needs for children who have visual or auditory impairments. Disabilities can vary from total blindness and hearing loss to a partial loss. It is important to mention that these children can often perform any task if given the appropriate modifications. Allowing students to touch animals or plants for evaluation and identification or using magnifying glasses to see detail more clearly are just a few examples of strategies to benefit these children. Flashing lights or Powerpoints on a timer with visual cues can help children with auditory needs know when to transition to another activity or help them know when their time is up for an event.

Ensuring Facilities Are Able To Accommodate Specific Needs

Children who are in a wheelchair or have physical limitations may need special support when participating in events. Show rings in particular can be treacherous for individuals with disabilities. Before attending events or planning activities, visit sites yourself or contact your state offices to ensure children will have the ability to move as needed. Special equipment may also be helpful such as wheelchairs with sand tires that allow better movement during showing or livestock evaluation contests. Children who are quadriplegic or paraplegic may also have difficulty determining if they are getting over heated. For outdoor events, special care should be taken to help them stay cool and hydrated. Additionally, wheelchairs are often considered to be an extension of the person so be sure to ask if it is okay to help them move through obstacles.

Special Programs Such As Therapeutic Riding and Special Show Classes

If programs have several children who have specific needs, then special programs may be an ideal way to help these learners participate in an environment that is specially developed for them. There are many established animal and plant therapy programs as well as therapeutic rid-

ing programs. It may be possible for teachers and agents to partner with these already established programs to meet the needs of diverse learners. If programs do not already exist, there are many resources available to help teachers and agents start programs with the help of local volunteers and resources.

Patience and understanding are two of the best tools teachers and agents can use when working with children who have special needs. These children are often very willing to participate and work with others if we can provide them with the tools that they need to be successful. Talk with others in your community, visit with parents or guardians and ask about possible resources that can help children more fully participate. Most importantly, communicate with the children to find out what they believe their needs are and develop a plan for success that focuses on their strengths. With a little planning and resources, we have the opportunity to help all children develop the skills they need to be successful when participating in youth organization activities, the classroom and in life.

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Actions Speak Louder than Words:... ***(continued from page 9)***

- *Make yourself approachable to students.* Have an open-door policy. However, this may mean prying your eyes away from your email when a student wants to chat. If you are like me and have trouble avoiding the pile of work on your desk, set aside time each day to talk with students informally. This increases your approachability in students' eyes, as well as discourages them from approaching you for informal conversation during your designated "paperwork" times.
- *Be enthusiastic about the subject you are teaching.* Lucky for agricultural science teachers, most of us enter the profession because of our inherent passion for agriculture. However, on the days that you are teaching about a component of the industry that may not be your favorite, maintain your enthusiasm so your students can make their own decisions about what aspects of agriculture excite them. Try to avoid starting your lesson with the phrase "I know this is boring, but…"

There is no magic bullet to get all students engaged in the learning process. However, by utilizing teacher immediacy behaviors and building rapport with your students, you can increase the overall engagement in your classroom, and reduce those "Bueller…?" moments that all teachers desperately want to avoid!

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REAL University Supervised Experiences

by Thomas Wayne Atchley and Rudy S. Tarpley

Since its inception in public secondary schools in 1917, agricultural education has included some form of experiential education as a teaching strategy" (Talbert, Vaughn, & Croom, 2005, p. 421). The Smith-Hughes Act of 1917 not only mandated experiential learning, but led to the development of training programs, teacher organizations, and student organizations which were based on the integration of supervised experiences (Gordon, 1999). These supervised experiences have taken several forms with multiple names over the years. However, the Supervised Agricultural Experience (SAE) program has historically been considered essential in preparing students adequately for employment (Amberson & Bishop, 1967). Talbert, Vaughn, and Croom (2005) continued to list the benefits of the secondary supervised experience; (a) the development of decision making skills, (b) improved self-confidence, (c) application of knowledge learned in the classroom, (d) development of time management skills, (e) document of experience needed on job applications, (f) practice of responsibility and independence, and (g) development of pride through personal accomplishment. While the supervised experience is generally accepted as one of the base component programs in secondary agricultural education, perhaps its importance is not stressed enough at the post-secondary level.

It is generally accepted that a supervised teaching experience for university students in agricultural education is required for most, if not all, teacher education programs. However, not all programs require a supervised experience for students in agriculture programs outside of the field of teacher education. A cursory review of university programs in agricultural extension, industry, and communication shows that while not all universities require a supervised internship experience, many have made an internship an option for the degree.

> Supervised experience strengthens the understanding of knowledge required in the workforce.

At Tarleton State University, the department of Agricultural and Consumer Sciences (ACS) has incorporated a supervised experience as a requirement for graduation in the program areas of Agricultural Extension/Industry and Agricultural Communication to match the student teaching requirement in Agricultural Education. During the final semester of studies for all senior level students in the department (commonly referred to as the block semester), the students complete a shared experience that prepares them for the rigors of completing an eleven-week internship where they are assigned to a full-time position with an organization in their chosen field.

As part of the reaffirmation process with the Southern Association of Colleges and Schools, each university is required to develop and implement a Quality Enhancement Plan (QEP). As part of the accrediting process, the QEP is to describe a course of action that addresses a well-defined topic that enhances student learning. The QEP topic chosen for the 2010 reaffirmation of Tarleton State University was "Keeping it R.E.A.L.: *R*eal-world *E*xperiences *A*pplied to *L*earning." This topic is based on the theory of experiential learning. Just as in the secondary agricultural education SAE program, experiential learning suggests that learning is enhanced as students apply the experiences, knowledge and skills from the classroom in a real setting. Again, one way to implement the experiential learning process is through the supervised experience... student teaching and capstone internships.

Since the spring of 2012, Tarleton agricultural extension, industry, and communication block students have been completing the internship as part of the Keeping it REAL Applied Learning Experience (ALE) program. As a requirement of the ALE, students must complete a reflection at the completion of the experience. This reflection document is broken down into six component areas: (a) knowledge and skills within the discipline; (b) knowledge and skills outside of the discipline; (c) knowledge and skills outside the classroom; (d) interconnectedness of knowledge and skills across all areas; (e) global awareness in the context of academic, political, social, cultural and/or economic environments; and (f) larger implications of the experience as they apply to the discipline and beyond. By completing the reflection document, the students are compelled

to think through the experience and critically assess how the experience was influenced by or increased their awareness in the six required component areas. To receive credit for the internship as an applied learning experience, the reflection is graded using a standardized rubric. Additionally, the student is required to create an online portfolio of the experience that includes artifacts related to the experience such as pictures, videos, or other work samples.

Supervising faculty also use the internship to assess the overall preparedness of the students as they work through the internship. At the end of each week, the internship supervisor completes a brief evaluation of the student's performance. This formative evaluation is used by the faculty supervisor to make any changes or interventions required throughout the course of the experience. Supervising faculty also make site visits to observe the students in their normal business activity. These visits serve as a method for the faculty supervisor to meet one-on-one with the internship supervisor to discuss different aspects of the student/intern's performance. These performance evaluations and visits are crucial to the ongoing success of the block internship experience.

At the conclusion of the internship, the on-site supervisor completes a final formal evaluation. This evaluation is used to measure the overall effectiveness of the internship experience and results for all students are aggregated and reported as part of the program's annual assessment and reporting. These evaluations are also used to make changes to the program and have led to changes in curriculum across the programs. The feedback about student preparation and leadership has proven to be valuable and outweighs the additional overhead of conducting the experience.

Prior to the spring of 2012, evaluations were completed using an online web form or fax. This required manual data entry of the information into a spreadsheet for analysis. The manual data entry process also meant a lapse in time between the submission of the form and review by the supervising faculty member. Starting in the spring of 2012, an online survey was created to collect the evaluation information. The online form streamlined data collection and analysis of the weekly evaluations. The online system also generated an email confirmation when an evaluation was submitted. This allowed faculty supervisors to address issues as they occurred without waiting to review a fax or mailed evaluation. An added benefit of the electronic data collection was the ease of assessment for the internship experience. The final supervisor evaluation is used by the department to assess the different objectives of the degree programs. Using the online evaluation form decreases data entry errors and provides the program coordinator with actionable data in a timely manner. This has reduced the time and resources required to complete the annual assessment of the programs.

Overall, faculty within the department of Agricultural and Consumer Sciences at Tarleton State University consider this experience a benefit to the student from an experiential learning perspective. The internship has the added benefit of providing our students with real-world application and experience that makes them more appealing to potential employers. By providing all students with a supervised experience, Tarleton State University is strengthening student understanding of the knowledge and skills required to compete and succeed in the workforce. After years of research indicating the importance of SAE's at the secondary level, Tarleton State University has implemented a required supervised experience at the post-secondary level for every graduate in the department. Perhaps Smith and Hughes are smiling today.

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Applied Research Can Guide Your Curriculum Through Change

During Super Bowl XLVII the Dodge truck company ran a commercial featuring Paul Harvey describing the role of farmers. He said: "And on the eighth day, God looked down on his planned paradise and said, 'I need a caretaker.' So God made a farmer. God said, 'I need somebody willing to get up before dawn, milk cows, work all day in the field, milk cows again, eat supper, then go to town and stay past midnight at a meeting of the school board.' So God made a farmer." In addition to earning best Super Bowl ad, this commercial also summed up the critically important connection between agriculture and education.

Bois. J.. (2013). *Paul Harvey's Super Bowl ad is the best of 2013*. Retrieved from

http://www.sbnation.com/2013/2/3/3949176/paul-harvey-ram-super-bowl-ad-commercial-2013

Earlier this year, U.S. Secretary of Education Arnie Duncan addressed the 2013 National Agricultural Education Summit. In his speech, Secretary Duncan highlighted the importance of school-based agriculture education.

Duncan. A. (2010). *Agricultural Education in the 21st Century: Secretary Arne Duncan's Remarks at the FFA Convention*. Retrieved from http://www.ed.gov/news/speeches/agricultural-education-21st-century-secretary-arne-duncans-remarks-ffa-convention

by Jacob Tiemann, Kelty Garbee and Glen Shinn

What can we learn from research that will exploit the support provided by Paul Harvey and Secretary Duncan and improve our programs?

Some things change—and some things don't

Agriculture is impacted by many different factors ranging from population growth, changing demographics, and immigration to changes in technology, food security, and water supply. As a result, individuals who work in the food and agricultural sciences need to have knowledge and skills in many different areas, and particularly science, technology, engineering, and mathematics (STEM). Unfortunately, there are many challenges in attracting qualified students to pursue careers in the food and agricultural sciences with rural schools facing unique challenges preparing students for STEM careers.

Roscoe Collegiate Independent School District (RCISD) and its partners are collectively striving to address these challenges in order to increase educational attainment, promote economic development, and address national- and state-level workforce shortages.

Who we are—

RCISD is a small, rural Texas school district located in Nolan County some 325 miles west of Fort Worth. There are 17 people per square mile in Nolan County (the county in which RCISD is located), compared to 96 per square mile for the State (USDC, 2011). Agriculture and energy are central to the economy in the RCISD. In fact, of the more than 586,000 acres of land in Nolan County, only 3% is residential and the remainder is used for pastureland, crops, wind turbines, and oil wells (McDaniel, n.d.).

As of 2011, the population of Nolan County was 15,269 and the median household income was $37,102 (USDC, 2011). Educational attainment in Nolan County is below state averages. Although 77% of adults in the county are high school graduates (as compared to 80% for the state), only 17% have a bachelor's degree (as compared to 25% for the state) (USDC, 2011).

RCISD has one elementary and one high school that serve its 368 students in grades K-12. As a reflection of its local economy, the district's mascot is the plowboys and plowgirls. The student population is predominantly male (57.5%), Hispanic (57.3%) and majority economically disadvantaged (68.5%) (TEA, 2011). This represents an increase from approximately 30% economically disadvantaged in 1990, and if demographic trends continue as projected, the number of low-socioeconomic students will continue to expand rapidly.

Why change matters—

Research shows that low-socioeconomic status limits both educational attainment and earning potential. In fact, one study found that only

9% of students from low-income families go beyond a high school diploma (THECB, 2010). The Texas Higher Education Coordinating Board (2010) tracked the 1998 7th grade cohort through college graduation: of the 110,000 Hispanic students in this cohort, only 10% earned a college degree by 2009. Based on the recognition that impoverished students arrive at school lacking the cognitive structures that most non-poverty students possess, Roscoe Collegiate is focused on addressing issues of poverty by increasing educational aspirations and attainment and promoting economic development in the region.

How we are addressing change—

To address the above challenges, RCISD is designing and implementing the Roscoe Collegiate STEM Research Center in order to: (1) increase postsecondary educational attainment rates in the district; and (2) increase the number and diversity of students from the district and region who successfully earn postsecondary degrees (two- or four-year) in either food and agricultural sciences or related STEM fields.

Once it is fully operational, the Research Center will function as a STEM model that demonstrates the intersection between academic research and clinical practice. By creating this model of STEM education, RCISD is seeking to enhance the quality of K-12 and postsecondary instruction and the aspirations of students in order to help meet current and future national food and agricultural sciences workplace needs.

The goal of integrating STEM education across RCISD starts at the top with the RCISD Board of Trustees and Superintendent, Dr. Kim Alexander, who is leading efforts to assess, plan, and implement STEM education in the district. The foundation for these efforts was laid in 2009-2010, when the district converted its traditional comprehensive high school into an Early College High School (ECHS). Students in an ECHS earn either an Associate's degree or up to 60 college credit hours upon graduation from high school. This model has had a significant impact on RCISD.

> Individuals who work in the food and agricultural sciences need to have knowledge and skills in many different areas.

The ECHS model was originally designed to be implemented in large, urban high schools. When the Texas Education Agency (TEA) developed its Small and Rural Early College High School Grant, the agency was seeking districts that had the capacity, flexibility, and creativity to adapt the model to a small and rural district. Five districts received the planning grant, but RCISD was one of only two districts that developed a working model and received an award to move forward to successful implementation. Since that time, RCISD has garnered statewide recognition as an exemplary small and rural ECHS model.

Implementing Our Plan

Implementing an ECHS requires high levels of community collaboration and university partnership. In the process of transitioning its traditional, comprehensive high school into an ECHS, Dr. Alexander articulated the importance of developing and promoting a college-going culture to the school board and the community. As a result, the district began to promote itself as an ECHS district and implemented professional development and curricular changes gleaned from the ECHS model across the district from Pre-K through grade 12. In 2012, the district changed its name from Roscoe Independent School District to RCISD to communicate clearly the prominence of the college-going culture. Meanwhile, district leaders established strong dual credit relationships with two regional higher education partners, Western Texas College located in Snyder, Texas and Texas State Technical College, located in Sweetwater, Texas.

As the district increased levels of academic rigor and expectations through the ECHS model, teachers and administrators sought ways to demonstrate relevance and to provide students with connections between K-12, higher education, and the workforce. The superintendent and the RCISD Board of Trustees identified STEM education as a way to promote relevance while meeting identified regional and state workforce needs. Therefore, the creation of the Roscoe Collegiate STEM Research Center represents a natural and strategic extension of the district's efforts.

In order to begin the process of building buy-in and support for the Center the district convened a STEM Advisory Committee that includes representatives from the higher education, business, government, and legal communities. Through the

STEM Advisory Committee, the district held numerous conversations with stakeholders who will be instrumental in the project's success.

Education stakeholders in the Roscoe community are acutely aware of the need to increase and diversify the population of students pursuing postsecondary degrees in the agricultural sciences. It is well documented that demographics in Texas and across the country are shifting as the number of Hispanic students continues to increase (USDC, 2011). In fact, according to the Texas Education Agency, between 2010 and 2011, "Hispanics had the largest numerical increase in enrollment … rising by 81,316 students" and in 2011"Hispanic students accounted for the largest percentage of total enrollment (50.3%)" (TEA, 2011). Enrollment in agricultural fields of study at the postsecondary level is among the lowest for all majors in the nation (4%) and 90% of agriculture majors are white, which does not reflect changing demographics (Shinn, 2011).

School district and community leaders have long recognized the need to provide students with opportunities to study and pursue careers in agriculture and STEM fields in a relevant and rigorous manner and to inform all students in the district – particularly Hispanic students – about the variety of high-wage, high-skill careers available in agriculture and STEM fields.

The Roscoe Collegiate STEM Research Center will increase academic rigor and relevance by allowing students to gain access and exposure to STEM fields. By connecting classroom experiences with real-world work and research, Roscoe will add context to student learning, thereby increasing levels of college readiness and educational attainment. In this way, Roscoe will address a critical need to produce a highly skilled workforce for food, agriculture, natural resources, and environmental systems in the region and the state.

In Texas and across the country there is a well-documented shortage of veterinarians, both for large animals and in rural areas (Mach, 2011). This is a major concern in areas such as Nolan County where approximately 94% of the land consists of farms and ranches and cattle are among the most important livestock species for the economy (SEED, 2011). Research indicates that two factors contribute to veterinarian shortages in Texas including a lack of experience with large animals and concerns about limited opportunities in rural areas (Lenarduzzi, Sheppard, & Slater, 2009).

Our goal is to use veterinary science to inspire students to pursue science education through providing rigorous and relevant, hands-on experiences, at an early age and, in so doing, increase preparation for and enrollment in agricultural science and the sciences in general. Too many times, students are asked to learn science because "they will need it later." However, our goal is to provide the "why," in order to inspire students to study the sciences.

Leaders in RCISD recognize the need for innovations to be sustainable and scalable. Therefore, a unique aspect of the STEM Research Center is an emphasis on becoming self-sustaining. The school district is establishing working relationships with a variety of partners, including a for-profit veterinary practice, a college of veterinary medicine, and pharmaceutical and biotechnology companies. This combination of partners has significant potential to garner resources and support while providing a sophisticated array of services, technologies, and support to local farmers and ranchers that are not currently available in the region.

By observing and participating in veterinary science and biotechnology, students will be asked to engage actively in multidisciplinary, problem-based learning. Veterinary science and biotechnology (like other STEM fields) require daily use of knowledge from many different disciplines, including chemistry, biology, anatomy, physiology, engineering, mathematics, and business, among others. Exposing students to this authentic environment will enhance students' abilities to see connections among disciplines and to understand how to use data to solve real-world problems that arise from within the community. Obtaining these skills is important for all students as they pursue college and careers, but it is particularly crucial for students who are disadvantaged and underrepresented in higher education.

In January 2013, Dr. Sonny Ramaswamy, Director of the National Institute for Food and Agriculture at USDA, emphasized the need for increased emphasis on STEM education in agriculture as we feed, shelter and clothe 9 billion people in 2050. Duncan (2013) noted the departmental pledge for grant funds to integrate a STEM curriculum, including agriculture, and concluded his comments to the Agricultural Education Summit by saying, "we have to educate our way to a stronger economy."

Conclusion

The RCISD curriculum model is addressing community needs, increasing postsecondary educational attainment rates and increasing the number and diversity of students who are preparing for careers in the food and agricultural sciences or related STEM fields. There is space in the

winner's circle for students in agricultural education.

When the Roscoe Collegiate STEM Research Center comes to fruition, it will use STEM as a conduit for students to engage in real-world learning that results in increased educational attainment while meeting identified workforce needs and providing much-needed veterinary science and biotechnology expertise. For all of these reasons, this project has the potential to serve as a model for other small and rural areas. We hope you will join us in the efforts.

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