Teaching the Teacher: Teacher Perceptions of the Amount of Agricultural Mechanics Instruction Received as School-Based Agricultural Education Students

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Abstract
Agricultural mechanics is a subject area taught by nearly 90% of school-based agricultural education (SBAE) teachers in Iowa (Rudolphi & Retallick, 2011), making agricultural mechanics one of the most taught curriculum areas within SBAE (Herren, 2014). This research was guided by Ajzen's Theory of Planned Behavior and the purpose of this study was to describe the perception of training and skills SBAE teachers received as SBAE students in agricultural mechanics. Our research focused on the amount of individual training and skills received during SBAE agricultural mechanics courses as perceived by secondary SBAE teachers. These findings concluded that all five construct areas had little to no training as indicated by SBAE teachers. Because the grand mean scores for all five-construct area were so similarly rated lowly between the lowest (Soil and Water, GM=1.70) to highest (Structures and Construction, GM=2.62) rated, it can be concluded that the SBAE teachers in this study are not receiving agricultural mechanics training in SBAE. If SBAE teachers are receiving little to no training in agricultural mechanics, could we continue to see teacher attrition issues similarly to Walker, et al. (2004)? If so, measures will need to be put into place by teacher education institutions, state SBAE associations, and industry to provide additional training to ensure teachers are proficient in teaching agricultural mechanics. If there are no interventions put into place to improve agricultural mechanics instruction, the cycle of untrained teachers will continue to spiral.

Introduction
Agricultural mechanics courses are taught by nearly 90% of Iowa School-Based Agricultural Education (SBAE) teachers (Rudolphi & Retallick, 2011), supporting Herren's (2014) notion that agricultural mechanics is one of the most commonly taught curriculum areas in SBAE Although popular at the secondary level, those who teach it expressed less confidence teaching agricultural mechanics coursework when compared to other agricultural content areas (Byrd, et al., 2015). Even with this self-reported lack of competency Byrd et al. (2015) reported that Iowa SBAE teachers identified agricultural mechanics as important in the curriculum. This lack of confidence seems to exist due to multiple factors. One of these factors was explored in depth by Shultz, et al. (2014) regarding correlations between SBAE teachers' perceived importance of the agricultural mechanics curriculum and their perceived lower-level capabilities for teaching

agricultural mechanics. Further, this disconnect between importance and capability is exacerbated by the failure to reach an agreement on how to evolve agricultural mechanics curriculum with the changing industry (Shultz et al., 2014). Curricular uncertainty related to focusing on specific career clusters, work in general, or life in general (Rojewski, 2002), can be a cause for outdated curriculum or a decline in agricultural mechanics courses offered at the secondary level (Shultz et al., 2014; Reis & Kahler, 1997).

When considering enrollment, Reis and Kahler (1997) found that students most often attributed reasons for enrollment to their parents and other personal and organizational factors Shultz et al. (2014), reported that although students can see the importance of agricultural mechanics courses, Shinn (1998) described secondary agricultural mechanics as being outdated and not cutting edge. This view of outdated and old-fashioned agricultural mechanics coursework has developed concerns, but those who are involved in developing the curriculum often fail to agree on what the new and improved curriculum should include (Shultz et al, 2014). With the discrepancy in mind, the question of who is the most qualified to what agricultural mechanics content should be included in the curriculum is critical. Further, the need for current SBAE teachers' knowledge to be utilized when establishing ongoing professional development needs and teacher preparation topics remains essential (Shultz et al, 2014).

Agricultural mechanics courses have a central goal of transferring practical knowledge and skills into real-world application (Phipps, et al., 2008). If students are not receiving the proper amount of training while they are in SBAE to be able to transfer knowledge, it could affect the likelihood they pursue a career in agricultural mechanics, whether in teaching or in another profession. When receiving coursework-related experience prior to teaching in a given subject area, higher self-confidence in regard to teaching the material has been reported by SBAE teachers (Burris, et al., 2010; Stripling & Roberts, 2012), By gaining the self-confidence to teach the material, one will also develop self-efficacy, or their "beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994, p. 71). Research has shown that those who participate in SBAE agricultural mechanics courses and have a positive experience are more likely to place importance on continuing their agricultural mechanics coursework at the post-secondary level (Wells, et al. 2013).

Competency and confidence in instructing agricultural mechanics courses is imperative for the success of a SBAE teacher and ultimately the SABE program. While most agricultural mechanics courses are grounded in hands-on experience, there are still a vast number of pre-service teachers who have had both secondary and post-secondary agricultural mechanics experiences, yet still feel uncomfortable or less knowledgeable teaching agricultural mechanics courses (Byrd et al, 2015; Wells, et al, 2013). Being a first-year teacher can be daunting to anyone, regardless of how much training they've received. Add to that the fear, anxiety, and the responsibility of handing dangerous equipment such as power tools and welding equipment, it becomes easy to see the need for proper education on these topics. Walker, et al. (2004) found that those teachers who left the profession completely or moved to another school did so because many did not enjoy teaching agricultural mechanics content. This could directly relate to the development of self-efficacy and previous experiences with an agricultural mechanics laboratory (Bandura, 1994; Burris et al, 2010; Stripling & Roberts, 2012). In creating a successful SBAE teacher, steps must be taken to ensure these future teachers are receiving adequate training in all subject matters entailed in SBAE, including agricultural mechanics. If SBAE teachers perceive their own secondary education experiences in agricultural mechanics to be ineffectual, and are therefore skeptical of their own skills in the classroom, how can they be expected to create successful students?

Theoretical Framework

This research was guided by Ajzen's Theory of Planned Behavior. Ajzen (1991) stated that "general attitudes and personality traits are implicated in human behavior, but that their influence can be discerned only by looking at broad, aggregated, valid samples of behavior" (p. 181). Actual behavioral control is something that is more easily attained because it includes resources such as time and money, which in turn will, to some extent, increase the likelihood that the person is more likely to exhibit a behavior (Ajzen, 1991). Bandura (1982) also stated that perceived self-efficacy, a major factor in behavior, "is concerned with judgments of how well one can execute courses of action required to deal with prospective situations" (p. 122). If a person feels confident in performing, they will be more likely to do so (Bandura, 1982).

We operationalized this concept as the likelihood that beliefs developed by an SBAE teacher when themselves a student will influence how they behave when they are teaching, influencing what they will chose to teach. "Perceived behavioral control refers to people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991, p. 183). This statement encompasses this study by stressing how people will perform depending on how easy or difficult the task seems to them. For example, in this study, SBAE teachers were questioned about how easy or difficult they perceived a task to be based on what they learned while in their high school mechanics courses. This survey resulted in exactly what Ajzen's Theory of Planned Behavior incorporates.

Looking more closely at Ajzen's Theory of Planned Behavior, we can see the central factor in the theory. This factor is the "individual's intention to perform a given behavior, with the assumption that the intention is how much effort the individual is planning to exert to perform the behavior" (Ajzen, 1991, p. 181). But this behavioral intention "can only find expression in behavior if the behavior is under volitional control" (Ajzen, 1991, p. 181). Therefore, if the person has no choice in the behavior being performed, then it does not qualify as an intention. The idea of perceived behavioral control is what makes the Theory of Planned Behavior different than the Theory of Reasoned Action (Ajzen, 1991). Perceived behavioral control can be used, together with intention, to predict behavioral performance (Ajzen, 1991).

The Theory of Planned Behavior requires four conditions be met in order to obtain accurate prediction. The first condition is that "intentions and perceptions of control must be assessed in relation to the particular behavior of interest and the specified context must be the same as that in which the behavior is to occur" (Azjen, 1991, p. 185). Azjen (1991) further stated that the second condition needing to be met is that "intentions and perceived behavioral control must remain stable in the interval between their assessment and observation of the behavior" (p.185). "The third requirement for predictive validity has to do with the accuracy of perceived behavioral control" (Azjen, 1991, p. 185). If these conditions are met, one should be able to obtain an accurate prediction of behavior. The relevance of accurate prediction of behavior in this study is that with the knowledge of this research and the findings of Byrd et al (2015) and Wells et al. (2013), one can confidently predict what constructs will be perceived by SBAE teachers as those that they have proficient knowledge. Figure 1 below is a representation of Ajzen's (1991) Theory of Planned Behavior.

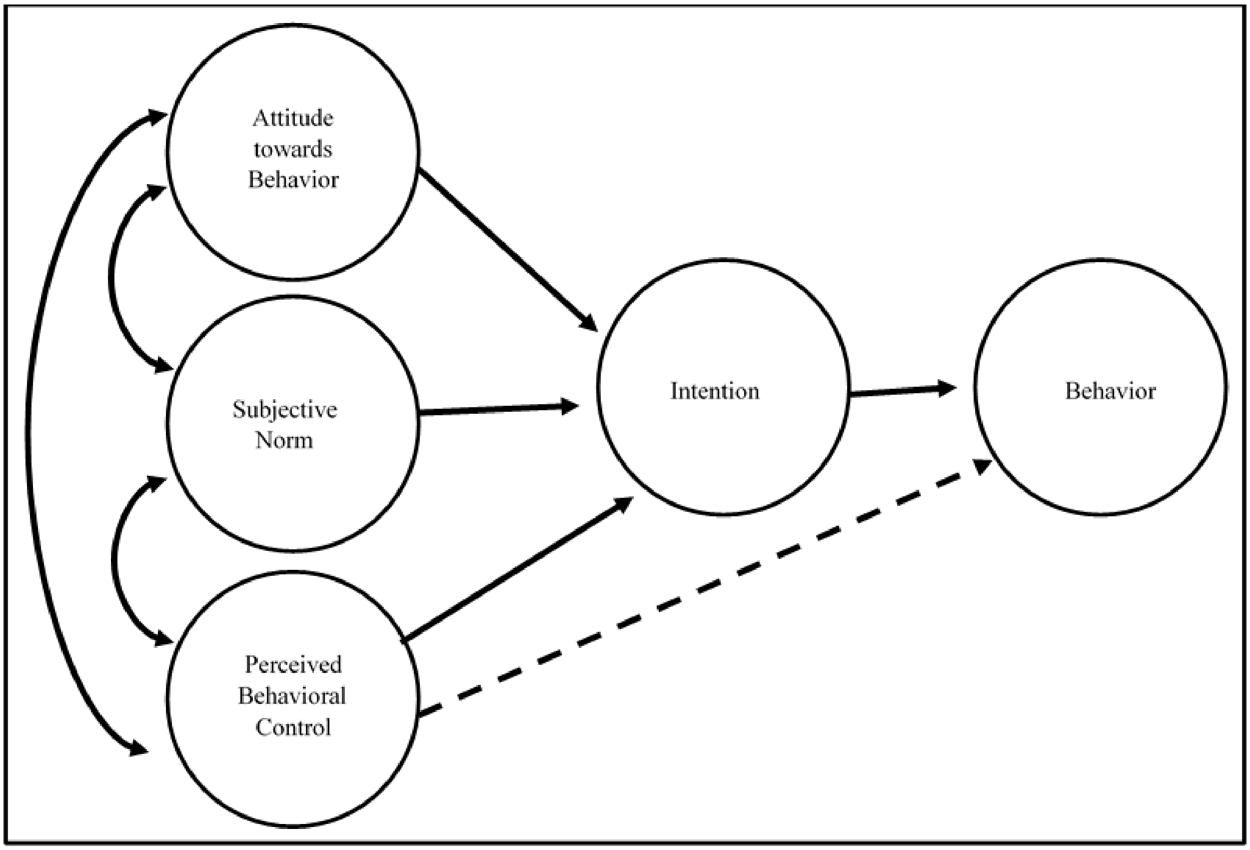

Figure 1. Theory of Planned Behavior (Adopted from Ajzen, 1991).

Purpose & Objectives

The purpose of this study was to describe the perception of training and skills current SBAE teachers received in their SBAE agricultural mechanics experiences related to specific agricultural mechanics constructs. This study aligns with the American Association for Agricultural Education's National Research Agenda (Roberts, et al., 2016) Research Priority Area 5: Efficient and Effective Agricultural Education Programs. There is a collective aspiration for basic education in agricultural mechanics (Ramsey & Edwards, 2011). The responsibility of teaching agricultural mechanics principles falls on SBAE teachers. "The knowledge and skill needed by agricultural education professionals will continue to grow as our society and needs if stakeholders become more complex" (Roberts, et al., 2016, p. 45). This study describes the strengths and shortcomings of SBAE teachers as encountered in their own SBAE experiences. The following research objectives were identified to accomplish this study:

1. Describe selected characteristics, both personal and professional, of Iowa SBAE teachers.

2. Describe the amount of agricultural mechanics training and skills received in SBAE while students as perceived by SBAE teachers.

Methods and Procedures
This descriptive study was conducted as part of a larger study in agricultural mechanics training which utilized survey research methods to summarize characteristics, attitudes, and opinions to accurately describe a norm (Ary, et al., 2006). A researcher-modified, paper-based questionnaire was used to address the objectives of the study. The instrument contained three sections. Section one included 54 skills related to agricultural mechanics. Skills were separated into five constructs including: Mechanic Skills, Structures/Construction, Electrification, Power and Machinery, and Soil and Water. Respondents were asked to use a five-point summated rating scale to rate their perceptions of the amount of training they received in each skill area while in SBAE. Section two consisted of 15 demographic questions relating to the teacher, and section three included nine questions about program and school characteristics. Content and face validity was reviewed by a team of five university faculty members with expertise in the fields of agricultural mechanics and agricultural education. Following the recommendations of Dillman, et al. (2009), the initial electronic version of the instrument was pretested through a pilot study with a group of 12 SBAE teachers in a nearby state. Suggestions from this pilot study led researchers to adopt a paper-based, rather than electronic instrument.

Reliability was estimated following the suggestions of Gliem and Gliem (2003) and resulted in reliability coefficients for training received while students in SBAE were calculated for each construct as follows: Mechanic Skills ($\alpha = .960$), Structure and Construction Skills ($\alpha = .970$), Electrical Skills ($\alpha = .910$), Power and Machinery Skills ($\alpha = .970$), and Soil and Water Skills ($\alpha = .820$). Per George and Mallery (2003), the Mechanic Skills, Structure and Construction Skills, Electrical Skills, and Power and Machinery Skills constructs were regarded as Excellent, while the Soil and Water Skills construct was rated as Good. A summary of construct reliability coefficients is displayed in Table 1.

Table 1

Post-hoc Reliability Coefficients for Training Received at Secondary Level by Construct Area

Construct Area	Mechanics	Structures/ Construction	Electricity	Power and Machinery	Soil & Water
Amount of Training at Secondary Level	0.96	0.97	0.91	0.97	0.82

Data were collected through a census conducted during the Iowa SBAE teachers conference. This population was purposively targeted because of the convenience and their likelihood to be involved in additional professional development activities. Researchers distributed a questionnaire to all SBAE teachers ($N = 130$) in attendance and asked that it be completed by the end of the conference. Each participant was offered a power tool institute safety curriculum as an incentive for completing and returning the questionnaire. These efforts yielded a sample of 103 usable instruments for a 79.2% response rate. Non-response error was addressed following the suggestions of Miller and Smith (1983) by comparing respondents' personal and program demographic data to data provided from the Iowa Department of Education (2010). A Pearson's χ^2 analysis yielded no significant differences *($p > .05$)* for gender, age, highest degrees held, years of teaching experience, or size of school community between respondents and the general population of SBAE teachers in Iowa. As a result, no further effort was made to obtain data from non-respondents. However, due to the purposively selected sample, data from this study should be interpreted with care and not extrapolated beyond the target population. Data were coded and analyzed using SPSS 24.0. Descriptive statistics (frequencies, percentages, and grand means) were calculated for each of the five constructs.

Results

The first research objective sought to describe the personal and professional demographics of participating SBAE teachers. The typical respondent for this study was a male teacher (f = 69, 67.0%), held a bachelor's degree (f = 64, 62.1%), had five or less years of teaching experience (f = 32, 31.1%), was in a single teacher department (f = 91, 90.0%) and taught in a rural school district (f = 80, 79.2%). Table 2 contains a summary of respondent characteristics.

Table 2

Summary of Respondents' Demographic Characteristics

	f	%
Gender		
Male	69	67.0
Female	34	33.0
Highest Level of Education		
Bachelor's Degree	64	62.1
Master's Degree	39	37.9
Years of Teaching Experience		
0-5	32	31.1
6-10	22	21.4
11-15	11	10.7
16-20	7	6.8
21-25	5	4.8
26-30	10	9.7
More than 30	16	15.5
Campus Location Designation		
Rural (population less than 5,000)	80	79.2
Small Urban (population between 5,000 and 20,000)	19	18.8
Urban (population greater than 20,000)	2	2.0
Number of Agricultural Science Teachers in Department		
1 Teacher	91	90.0

2 Teachers	7	7.0
3 Teachers	3	3.0

Describing the amount of agricultural mechanics training and skills received while students in SBAE as perceived by secondary SBAE teachers was the goal of research objective two. Fifty-four skills were separated into five constructs. These constructs included Mechanic Skills, Structures/Construction, Electrical, Power and Machinery, and Soil and Water. Individual items represented specific skills within the constructs and were rated in terms of amount received using the following five-point summated adequacy scale: as *none, some, moderate, strong, and very strong.* Table 3 displays the grand means and standard deviations for each construct.

Table 3

Grand Means of Iowa Secondary Agricultural Teachers Training received at the Secondary Level by Construct Area

Construct	*M*	*SD*
Mechanics	2.04	0.87
Structures and Construction	2.62	1.14
Electricity	1.99	1.04
Power and Machinery	1.95	0.88
Soil and Water	1.70	0.69

Note: Based on a scale of 1: None, 2: Some, 3: Moderate, 4: Strong, and 5: Very Strong.

The amount of Mechanics training and skills received as a student in SBAE were rated as some (*GM* = 2.04, *SD=0.87)*. Teachers reported having an almost even distribution of training and skills with oxyacetylene cutting with 27 (27.8%) reporting none, 22 (22.7%) reporting some and moderate respectively, while 21 (21.6%) reported strong and only five (5.2%) reporting very strong training and skills received as students in SBAE. Interestingly, welding safety (*f* = 18, 18.6%), and arc welding (*f* = 11, 11.2%) were the two skill areas that had the highest reported amount of "very strong" training and skills reported. A majority of the SBAE teachers reported receiving no training and skills in Gas Tungsten Arc Welding (54.7%), Pipe Cutting & Threading (51.2%), Plumbing (52.3%), Fencing (53.6%), and Computer Aided Design (63.1%). Oxyacetylene cutting, shielded metal arc welding, and welding safety were the only three skills that the majority of SBAE teachers reported receiving moderate, strong, or very strong training and skills as a SBAE student. It is also interesting to note that none of the SBAE teachers reported receiving very strong training and skills as SBAE students in Oxy-propylene cutting, Gas Tungsten Arc Welding, Cold Metal Work, Soldering, Pipe Cutting, Plumbing, Fencing, or Computer Aided Design. Frequencies and percentages for each skill within the Mechanic skills construct are displayed in Table 4.

Table 4

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Mechanic Skills

		None	Some	Moderate	Strong	Very Strong
Skill	*n*	*f*(%)	*f*(%)	*f*(%)	*f*(%)	*f*(%)
Oxy-acetylene Welding	97	27(27.8)	22(22.7)	22(22.7)	21(21.6)	5(5.2)
Oxy-acetylene Cutting	98	23(23.5)	23(23.5)	26(26.5)	20(20.4)	6(6.1)
Oxy-propylene Cutting	85	49(57.6)	20(23.5)	7(8.2)	9(10.6)	0
Plasma Cutting	92	45(48.9)	19(20.7)	14(15.2)	11(12.0)	3(3.3)
SMAW Welding (Arc)	98	19(19.4)	22(22.4)	23(23.5)	23(23.5)	11(11.2)
GMAW Welding (Mig)	95	35(36.8)	21(22.1)	15(15.8)	20(21.1)	4(4.2)
GTAW Welding (TIG)	86	47(54.7)	18(20.9)	13(15.1)	8(9.3)	0
Welding Safety	97	20(20.6)	19(19.6)	18(18.6)	22(22.7)	18 (18.6)
Metallurgy & Metal Work	86	36(41.9)	24(27.9)	14(16.3)	11(12.8)	1(1.2)
Hot Metal Work	85	39(45.9)	23(27.1)	14(16.5)	8(9.4)	1(1.2)
Cold Metal Work	85	41(48.2)	22(25.9)	11(12.9)	11(12.9)	0
Tool Conditioning	85	37(43.5)	20(23.5)	19(22.4)	9(10.6)	0
Oxy-acetylene Brazing	92	33(35.9)	25(27.2)	18(19.6)	13(14.1)	3(3.3)
Soldering	90	43(47.8)	23(25.6)	15(16.7)	9(10.0)	0
Pipe Cutting & Threading	84	43(51.2)	21(25.0)	15(17.9)	5(6.0)	0
Plumbing	86	45(52.3)	21(24.4)	15(17.4)	5(5.8)	0
Fencing	84	45(53.6)	17(20.2)	18(21.4)	4(4.8)	0
Mechanical Safety	90	29(32.2)	21(23.3)	15(16.7)	18(20.0)	7(7.8)
Computer Aided Design (CNC)	84	53(63.1)	16(19.0)	8(9.5)	7(8.3)	0

Table 5 displays the amount of Structure and Construction training and skills received as a student in SBAE was rated as some (*GM*=2.62, *SD*=1.14). Only 12 (12.9%) and 11 (12%) of SBAE teachers indicated that they received very strong training and skills in hand tools and shop safety respectively. All nine of the skills within the Structure and Construction construct area relatively evenly distributed between none, some, moderate, and strong training. It should be noted that a minimum of 19.4% of the SBAE teachers received no SBAE instruction for all nine structure and construction skill areas.

Table 5

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Structures and Construction Skills

		None	Some	Moderate	Strong	Very Strong
Skill	*n*	*f*(%)	*f*(%)	*f*(%)	*f*(%)	*f*(%)
Hand Tools	93	18(19.4)	17(18.3)	24(25.8)	22(23.7)	12(12.9)
Power Tools	92	18(19.6)	17(18.5)	24(26.1)	24(26.1)	9(9.8)
Drawing and Sketching	85	23(27.1)	16(18.8)	26(30.6)	15(17.6)	5(5.9)
Concrete	86	29(33.7)	19(22.1)	21(24.4)	14(16.3)	3(3.5)
Material Selection	89	24(27.0)	22(24.7)	20(22.5)	19(21.3)	4(4.5)
Bill of Materials	90	20(22.2)	19(21.1)	23(25.6)	23(25.6)	5(5.6)
Fasteners	87	24(27.6)	28(32.2)	19(21.8)	13(14.9)	3(3.4)
Construction Skills	91	22(24.2)	18(19.8)	23(25.3)	22(24.2)	6(6.6)
Construction and Shop Safety	92	19(20.7)	16(17.4)	22(23.9)	24(26.1)	11(12.0)

Table 6 displays the amount of Electrical training and skills received as a student in SBAE was rated as none (*GM*=1.99, *SD*=1.04). Only 7 (8%) SBAE teachers indicated that they received very strong training in electrical safety. Six (6.7%) SBAE teachers indicated that they received very strong training and skill development in wiring skills and electrician tools. It should be noted that a minimum of 37.9% of the SBAE teachers received no SBAE instruction for all six Electrical skill areas.

Table 6

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Electrical Skills

		None	Some	Moderate	Strong	Very Strong
Skill	*n*	*f*(%)	*f*(%)	*f*(%)	*f*(%)	*f*(%)
Electricity Controls	88	40(45.5)	25(28.4)	16(18.2)	5(5.7)	2(2.3)
Wiring Skills (Switches & Outlets)	90	37(41.1)	23(25.6)	17(18.9)	7(7.8)	6(6.7)
Electrician Tools	90	37(41.1)	22(24.4)	18(20.0)	7(7.8)	6(6.7)
Types of Electrical Motors	85	41(48.2)	24(28.2)	15(17.6)	4(4.7)	1(1.2)
Cleaning Motors	81	41(50.6)	21(25.9)	14(17.3)	4(4.9)	1(1.2)
Electrical Safety	87	33(37.9)	20(23.0)	18(20.7)	9(10.3)	7(8.0)

Table 7 displays the amount of Power and Machinery training and skills received as a student in SBAE was rated as none (*GM*=1.95, *SD*=0.88). Only eight (9.2%) SBAE teachers indicated that they received very strong training in four-cycle small gas engine services, small engine overhaul, and small engine safety. It should be noted that a minimum of 33.3% of the SBAE teachers received no SBAE instruction for all 15 Power and Machinery skill areas. A majority of the SBAE teachers indicated that they received no training in tractor driving (50.6%), tractor selection (53.8%), and tractor overhaul (56.3%).

Table 7

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Power and Machinery Skills

		None	Some	Moderate	Strong	Very Strong
Skill	*n*	*f*(%)	*f*(%)	*f*(%)	*f*(%)	*f*(%)
Small Engine Services - 2 Cycle	85	32(37.6)	18(21.2)	22(25.9)	9(10.6)	4(4.7)
Small Engine Services - 4 Cycle	87	29 (33.3)	19(21.8)	21(24.1)	10(11.5)	8(9.2)
Small Engine Overhaul	87	32(36.8)	20(23.0)	18(20.7)	9(10.3)	8(9.2)
Small Engine Safety	87	31(35.6)	16(18.4)	18(20.7)	14(16.1)	8(9.2)
Tractor Service	82	40(48.8)	22(26.8)	14(17.1)	6(7.3)	0
Tractor Maintenance	81	40(49.4)	22(27.2)	14(17.3)	4(4.9)	1(1.2)
Tractor Overhaul	80	45(56.3)	22(27.5)	10(12.5)	3(3.8)	0
Tractor Selection	78	42(53.8)	24(30.8)	8(10.3)	4(5.1)	0
Tractor Operation	80	39(48.8)	22(27.5)	11(13.8)	8(10.0)	0
Tractor Safety	82	38(46.3)	20(24.4)	14(17.1)	8(9.8)	2(2.4)
Tractor Driving	81	41(50.6)	20(24.7)	12(14.8)	5(6.2)	3(3.7)
Service Machinery	81	38(46.9)	21(25.9)	14(17.3)	8(9.9)	0
Machinery Selection	80	37(46.3)	19(23.8)	18(22.5)	6(7.5)	0
Machinery Operation	82	37(45.1)	23(28.0)	16(19.5)	6(7.3)	0
Power and Machinery Safety	84	35(41.7)	21(25.0)	17(20.2)	8(9.5)	3(3.6)

Table 8 displays the amount of Soil and Water training and skills received as a student in SBAE was rated as none (*GM*=1.70, *SD*=0.69). Only 8 (2.4%) SBAE teachers indicated that they received very strong training in legal land descriptions. Two (6.7%) SBAE teachers indicated that they received very strong training and skill development in Global Positioning Systems (GPS). It should be noted that a minimum of 30.6% of the SBAE teachers received no SBAE instruction for all five Soil and Water skill areas. A majority of the SBAE teachers indicated that they received no training in GPS (54.8%), use of survey equipment (53.6%), differential leveling (61.8%), and profile leveling (61.8%).

Table 8

Amount of Training and Skill Received at the Secondary Level of Agricultural Educators for Soil and Water Skills

Skill	*n*	None *f*(%)	Some *f*(%)	Moderate *f*(%)	Strong *f*(%)	Very Strong *f*(%)
Global Positioning Systems (GPS)	84	46(54.8)	20(23.8)	9(10.7)	7(8.3)	2(2.4)
Use of Survey Equipment	84	45(53.6)	22(26.2)	9(10.7)	7(8.3)	1(1.2)
Differential Leveling	76	47(61.8)	24(31.6)	3(3.9)	2(2.6)	0
Profile Leveling	76	47(61.8)	23(30.3)	3(3.9)	3(3.9)	0
Legal Land Descriptions	85	26(30.6)	24(28.2)	15(17.6)	12(14.1)	8(9.4)

Conclusions
The purpose of this study was to describe the perception of the amount of training and skills current SBAE teachers received in their SBAE agricultural mechanics experience related to specific agricultural mechanics constructs. The results of this study aligned with the findings of Byrd, et al. (2015) in that SBAE teachers indicated that in the construct area of structures and construction, they felt the most prepared. However, it should be noted that the individual skills within the construct were evenly distributed between none and strong. Therefore, we can conclude the amount of training in the highest rated constructed was inconsistent among SBAE teachers. Although Byrd et al. (2015) was looking at college courses and teacher competency, the research is applicable when analyzing Ajzen's Theory of Planned Behavior's qualifications for accurate behavior prediction (Ajzen, 1991) and Wells et al. (2013) findings about exposure to specific agricultural mechanics topics and how that influences post-secondary decisions from experiences at the secondary SBAE level. If we want SBAE teachers to teach agricultural mechanics in their programs, then SBAE teachers need to be exposed to positive experiences. This is significant because according to Rasty, et al. (2016), the current agricultural mechanics content being taught or lack thereof to secondary students will impact the content those students will choose to teach in the future.

Our research focused on the amount of individual training and skills received during SBAE agricultural mechanics courses as perceived by secondary SBAE teachers. These findings concluded that all five construct areas provided little to no training as indicated by SBAE teachers. The three skills that were most frequently identified as "Very Strong" training included two skills from the structures and constructions construct; Hand Tools (f = 12.9%) and Construction and Shop Safety (f = 12%) and the skill that had the most responses of Very Strong training was Welding Safety (f = 18.6%). These findings are significant for post-secondary education of pre-service teachers in order to have an idea on what programs need to be required of pre-service students before entering the profession (Byrd, et al, 2015). Because the Grand Mean scores for all five-construct area were so similarly rated between the lowest (Soil and Water, *GM*=1.70) to highest (Structures and Construction, *GM*=2.62), it can be concluded that the SBAE teachers in this study are not receiving agricultural mechanics training in SBAE. If SBAE teachers are receiving little to no training in agricultural mechanics, could we continue to see similar teacher attrition issues similarly to Walker, et al. (2004)? If so, measures will need to be put into place by teacher education institutions, state SBAE associations, and industry to provide additional training to ensure teachers are proficient in teaching agricultural mechanics. If there are no interventions put into place to improve agricultural mechanics instruction, the cycle of untrained teachers will continue to spiral.

The overall lack of training that the SBAE teachers received related to safety in agricultural mechanics is alarming at best. The lack of safety training will create high anxiety and avoidance in attempting to teach agricultural mechanics in SBAE. Furthermore, SBAE teachers who are forced to teach agricultural mechanics without the proper safety training could place SBAE students in harm's way leading to potential injuries or worse. It is critical to ensure SBAE teachers are properly trained on all safety guidelines and procedural steps associated with the tools and equipment in an agricultural mechanics laboratory for everyone's wellbeing.

Implications & Recommendations

This study has implications for current SBAE teachers, SBAE curriculum creators, SBAE students, pre-service SBAE teachers, professional development of in-service SBAE teachers, and for further research. The results of this study show that there is lack of instruction in the five agricultural mechanics construct areas at the SBAE level. Current SBAE teachers indicated that they perceived the SBAE agricultural mechanics training and skills they received to range between None to Some in each of the five constructs. Rosencrans and Martin (1997) identified basic knowledge and skills about agricultural technology as a key input for curriculum development. With the expressed lack of training received in SBAE, it is apparent that there will need to be training and personal development for both pre-service and in-service teachers to ensure that quality curriculum is developed and implemented. We recommend state teacher associations create an agricultural mechanics mentoring program where beginning teachers are partnered with expert teachers in the state to provided individualized training. We recommend the state association identify recently retired teachers who would be willing to volunteer their time and expertise to work with the young teachers over an extended period of time as opposed to traditional single shot training efforts.

Agricultural mechanics encompasses a large breadth of content and does not show any likelihood of narrowing in the future. What this means for SBAE teachers, along with curriculum creators, is that they will need to determine which skills are necessary for success at both the post-secondary level and in the workforce. The goal of instructors and education professionals should be to ensure that students leave SBAE programs with skills that make them employable and/or prepared to enter a post-secondary institution. Researchers should continue to probe individual skills within agricultural mechanics that SBAE teachers perceive as important to determine which skills are important to teach in the future. We recommend SBAE teachers conduct community needs assessments to identify the skills needed by their local workforce. Partnering with the local business and industry will aid in identifying community needs and assisting with employment incubation.

Keeping in mind research done by Wells et al, (2013) "it is conceivable to postulate that pre-service agricultural education teachers' attitudes about agricultural mechanics in secondary agricultural education are a likely determinant of the extent to which they pursue agricultural mechanics courses at the post-secondary level" (2013, p. 233); it is imperative that students at the secondary level are exposed to the agricultural mechanics skills that are deemed essential. While not specifically identified by the data collected in this study, but anecdotally collected through conversations during the data collection process teachers indicated that their SBAE teacher allowed them to work on a multitude of other items and not actual complete the content being taught in class. This sends the wrong message to future SBAE teachers, allowing them to develop a negative attitude towards the importance of agricultural mechanics instruction. We recommend that all students enrolled in SBAE agricultural mechanics courses be required to participate in the agricultural mechanics content being taught.

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