Instructor Levels of Importance and Competence With Alabama Agricultural Mechanics Standards

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Abstract

School-based agricultural education (SBAE) teachers formally acquire requisite skills across many content-based curricula pathways. This study aimed to understand Alabama agricultural mechanics teachers' perceived levels of competence with and the importance of Alabama agricultural mechanics standards. The participants were purposively stratified, including being a practicing SBAE teacher in Alabama with experience teaching agricultural mechanics, access to agricultural mechanics laboratory spaces, and currently teaching SBAE. The average participant in this study was a white male teacher who had been teaching for six to 11 years, and either was currently teaching or had taught agricultural mechanics in the past. Participants reported their perceived levels of importance and competence using interval-based measurement scales framed using the Borich Scale Analysis. The conclusions of this study suggested that standards connected to General Safety (Standard 1) and Electrical Wiring Tools (Standard 9) were "Very important." While nine of the remaining ten standards (2, 3, 4, 5, 7, 8, 10, 11, & 12) were determined to be "Important." More research needs to be done to understand the perceived barriers agriculture instructors in Alabama experience when implementing the agricultural mechanics curriculum standards in their classrooms.

Introduction

School-based agricultural education (SBAE) is integral to many public school systems. It serves the learning needs of students while helping to provide the future workforce for the farming industry and its allied sectors (Eck & Edwards, 2019). Clemons et al. (2018) discussed the importance of SBAE for developing competent and energetic students ready to embrace the needs of the 21st - century workforce. Clemons et al. (2018) further emphasized the importance of agriculture education as a "[l]lifelong journey of utilizing foundational skills and training for anticipated societal needs for the development of a well-trained and motivated student." (p. 87).

In 2015, The National Council for Agricultural Education established content standards in eight career pathways, known as the National Agriculture, Food, and Natural Resources (AFNR) content standards (NCAE, December 2023). Science, math, communications, leadership, management, and technology are integral components of a comprehensive SBAE program (NAAE, December 2023). McKibben and Murphy (2021) recognized the applied, practical, and experiential nature of agricultural education's reinforcement of the concepts taught in core classes. Howerton et al. (2019) specifically addressed the importance of preparatory programs to address the value of graduates entering the workforce with lifelong skills.

Talbert et al. (2014) defined a learning standard as "the expectation of what students should know and be able to do after completing the class." (p. 137). Although content standards may provide pedagogical directives, SBAE teachers are tasked with the deconstruction, delivery, and evaluative performance relative to the success of standards-based instruction. Essentially, learning standards exist to guide the educator to identify student learning opportunities and

evaluate student performance. Collectively, learning standards outline a content-rich curriculum for the establishment of career pathway preparation.

Career pathways often include (a) power, (b) structural and technical systems, (c) plant systems, (d) natural resource systems, (e) food products and processing systems, (f) environmental service systems, (g) biotechnology systems, (h) animal systems, and (i) agribusiness systems (NCAE, 2023). These content disciplines ground agricultural education instruction while the agriculture teacher's strengths, talents, and preparatory programs frame a pragmatic approach to student learning. Each pathway uses instructional learning standards to ensure that learning objectives and goals are universal across all SBAE programs in Alabama. Power, structural, and technical systems are ubiquitously and traditionally called agricultural mechanics. Agricultural mechanics is a long-standing and foundational career pathway in many SBAE programs, requiring the SBAE teacher to have sound preparatory skills to deliver instruction safely and effectively (Hainline & Wells, 2019; Saucier et al., 2014). SBAE teachers are equipped to teach several pathways within Agriculture, Food, and Natural Resources (AFNR).

According to the National FFA Organization (2016), over 11,000 SBAE programs exist in the United States. Clark et al. (2021) reported that 59% of those programs offered agricultural mechanics courses, which are almost exclusively experiential and laboratory-based (McKibben et al., 2023). Shoulders et al. (2013) emphasized the importance of laboratory instruction in creating experiential learning opportunities that the teacher can successfully facilitate to increase students' positive learning gains. Laboratory spaces in agricultural education often include greenhouses, farms, and agriculture mechanics facilities for student instruction and experience (Hancock et al., 2023). Positive learning outcomes are usually associated with how students interact with the instructional content delivered (McKibben et al., 2023). The value of instructional facilities dedicated to the development of cognitive analysis, critical thinking, and the development of problem-solving capacities is a vital component of the entire SBAE program (Clark et al., 2021; Cooper, 1992; Johnson & Schumacher, 1989; Phipps et al., 2008).

The SBAE teacher's awareness of content and pedagogy significantly impacts how the agricultural mechanic's laboratory is used (Rice & Kitchel, 2018). Newcomb et al. (1993) reported that preservice agriculture teachers and practicing teachers realize that staying updated on their current knowledge and skills is essential. Harlin et al. (2007) found that specific competencies, specifically broad content knowledge and content specialization, are critical to the success of a SBAE teacher. Teachers must take the initiative to have adequate preparation and experience in an agricultural classroom and laboratory to lead their instruction successfully. Clark et al. (2021) reinforced the value of teacher preparation in the mechanical sciences to develop future employees with basic mechanical aptitude and skills. Hubert and Leising (2000) suggested a need for sound laboratory and shop management instruction due to the significant time SBAE teachers spend in laboratories. McKibben et al. (2022a) spoke about the deficient levels of efficacy in basic agricultural mechanics skills with incoming preservice teachers, especially those who were highly active when they were agriculture students, the largest group of new teachers (McKibben et al., 2022b). With a large percentage of time spent in an agricultural mechanics laboratory, secondary and preservice agricultural education teacher candidates must be competent in multiple skills to effectively teach agricultural mechanics (Byrd et al., 2015).

Conceptual Framework

A needs assessment approach was conducted to better address the realities of SBAE teachers' instructional experiences when teaching agricultural mechanics standards. Needs assessment frameworks have often been used in agricultural education research to understand better the skills, knowledge, interests, and desires of SBAE teachers for their instructional and professional development. Numerous studies (Clemons et al., 2018; Salem et al., 2023; Weeks et al., 2020; Wells & Hainline, 2024) in SBAE have addressed the frameworks for needs assessment studies to identify the needs of teaching professionals more accurately.

Using reliable measurement tools is vital to understand better Alabama SBAE teachers' perceptions of standards-based instruction in agricultural mechanics. Specifically, when asking potential participants to assess their levels of competence and determine the degrees to which they value the importance of standards-based education, the Borich (1980) scale was most appropriate. According to Borich (1980), the measurable gap between importance and competence helps focus the chasm between importance and competence.

The Borich assessment model for conducting follow-up studies is often used in agriculture education research to identify participants' perceptions of various topics (Clemons et al., 2018; Duncan et al., 2005; Garton & Chung, 1996; Layfield & Dobbins, 2002; Ray et al., 2023; Saucier & McKim, 2011; Sorenson et al., 2010; Yopp et al., 2017). The use of the Borich model in this study is bound within the use of 12 AFNR and Alabama agriculture mechanics teaching standards. Borich (1980) pioneered his model by designing a survey instrument that weighs and ranks needs in order of respondent priorities, allowing the responses to be linked to a practical decision framework to improve the competency importance of the standards. Borich models attempt to gather additional information from respondents regarding their current knowledge of the topic under investigation and their ability to apply learning skills (Alibaygi & Zarafshani, 2008). Competency models such as the Borich needs assessment model are designed around the skills individuals and groups need to be effective in the future and are used to make human resources decisions (Alibaygi & Zarafshani, 2008).

Purpose and Research Objective

This quantitative study investigated Alabama SBAE teachers' experiences implementing agricultural mechanics curriculum standards in their classrooms. This study aimed to understand Alabama agricultural mechanics teachers' perceived levels of competence with and the importance of Alabama agricultural mechanics standards.

Methods

A statewide study was conducted to understand SBAE teachers' training needs and levels of importance/confidence regarding Alabama agriculture mechanics teaching and learning standards. The participants of this study consisted of 28 purposively selected Alabama SBAE teachers. Participants were selected to participate in the study if they had access to agricultural mechanics laboratory facilities, actively taught agricultural mechanics courses, and were teaching SBAE in Alabama. The participant frame for this study was obtained and accessed

using the Alabama Association of Agriculture Education teachers' digital membership roster. The membership roster contained only currently teaching SBAE teachers who are current and paid members of Alabama association. Participants with incomplete or missing data were removed from the potential population to reduce the potential for error. Consideration was given to the accuracy of the membership list as described by Lindner et al. (2001). Membership lists could contain missing or erroneous information about the participant population. To mitigate possible errors in membership reporting, a review panel consisting of Auburn University faculty, state agricultural education staff, and current practicing SBAE teachers in Alabama reviewed the membership data for accuracy and potential exclusion of participants with incorrect information.

The instrument for this study was adapted from Ray et al. (2022) study addressing the professional development needs of SBAE teachers in Georgia and modified to address the parameters of this investigation. The instrument consisted of 12 learning standard statements to address participants' confidence in teaching each of the 12 standards. The standards were arranged in the Borich model using interval measurement scales to determine participant responses: 1) very important/very competent, 2) important/competent, 3) somewhat important/somewhat competent, 4) of little importance/little competence, and 5) not important/not competent. A three-column instrument was developed where Alabama agriculture mechanics standards and their descriptions were displayed between the importance and competence columns in the center column.

A pilot study was conducted to address content and face validity with a representative group (n = 8) of dual roles SBAE teachers in Alabama and Georgia who also serve as adjunct professors at Auburn University and met the criteria for participants in this study (Lindner et al., 2001). The pilot study was used to reduce measurement error while maintaining that the statements and questions aligned with this study's research objectives (Dillman et al., 2014).

The pilot study was distributed using Qualtrics for panelists to address sentence structure, inclusivity, appropriateness of the Borich model, and any technological challenges associated with unique email address links, progression through the instrument, and submission. Pilot study participants recommended various changes to the language's syntax, aesthetics of the instrument's user interface, and minimal language changes. The recommended changes were incorporated to ensure the face and content validity of the instrument addressing the research objectives.

Purposively selected participants (N = 28) were contacted using Qualtrics distribution lists from [STATE ASSOCIATION] membership rosters. The initial email was structured according to Dillman et al. (2014) suggestions for recruitment, instruction, and delivery of email-based survey instruments. Three email reminders were sent to the potential respondents at one-week intervals. A comparative analysis between early and late participants was conducted using randomly selected variables to address the potential for and control of non-response error (Lindner et al., 2001). An independent t-test indicated no statistical differences between early and late study participants. Descriptive analyses were used to evaluate the resulting t-test data and were consistent with established methods reported by Blackburn et al. (2017).

Participant Characteristics

The participants of this study (Table 1) consisted of 28 ($N = 28$) SBAE teachers in Alabama, and the response rate was 100% ($N = 28$). Eleven participants reported actively teaching the agricultural mechanics pathways. Eleven participants reported that agricultural mechanics pathways had been taught but were not currently taught, and eight ($f = 8$) participants did not teach the agricultural mechanics pathway but would like to in the future.

Male teachers comprised the largest gender group of participants ($f = 23$). Six ($f = 6$) respondents were female, while one respondent ($f = 1$) preferred not to say (Table 1). Participants were asked to report their race using an open-ended question. White/Caucasian participants represented most respondents ($f = 29$), and one participant ($f = 1$) preferred not to say. The data was further analyzed by the number of years participants had taught. Four ($f = 4$) participants had been teaching for less than one year, and five ($f = 5$) participants had been teaching for one to five years. Of the participants, ten had been teaching for six to 10 years. Two ($f = 2$) respondents indicated that they had been teaching SBAE for 11 to 15 years, three ($f = 3$) participants had taught between sixteen and 20 years, and six ($f = 6$) indicated that they had been teaching between 21 and 25 years.

Table 1

Personal Characteristics of Participants

Personal Characteristics	*f*	*%*
Gender		
Male	23	77.00
Female	6	20.00
Prefer Not To Say	1	3.00
Total	30	100.00%
Race		
Caucasian	29	96.70
Prefer Not To Say	1	3.30
Total	30	100.00%
Years Teaching		
< 1	4	13.00
1 – 5	5	17.00
6 - 10	10	33.00
11 - 15	2	7.00
16 – 20	3	10.00
21 - 25	6	20.00
Total	30	100.00%

Results

The data and results of this study are represented in table (Table 2) and narrative format, and the findings are described in the context of Alabama SBAE teachers' characteristics, perceived importance, and levels of competence of Alabama agriculture mechanics standards. The

instrument consisted of 12 statements about the importance and competence of including agriculture mechanics teaching and learning standards in SBAE curricula.

Research Objective One: Better understand Alabama agricultural mechanics teachers' perceived levels of competence with and importance of Alabama agricultural mechanics standards. Results were calculated using the mean score and standard deviation of teachers' competency levels and significance. After collecting personal characteristics, two participants were removed from the study due to non-response.

Table 2

Participant Levels of Competence and Importance Related to Standards

Standard	Standard Code	Competence		Importance	
		M	*SD*	*M*	*SD*
Standard One	Blinded	4.96	0.19	4.60	0.56
Standard Two	Blinded	4.70	0.46	4.40	0.73
Standard Three	Blinded	4.60	0.57	3.70	0.96
Standard Four	Blinded	4.80	0.44	3.90	0.97
Standard Five	Blinded	4.40	0.68	3.60	0.98
Standard Six	Blinded	4.30	1.07	3.40	1.18
Standard Seven	Blinded	3.90	1.18	4.40	0.77
Standard Eight	Blinded	4.40	0.62	3.93	0.83
Standard Nine	Blinded	3.87	1.14	4.60	0.57
Standard Ten	Blinded	4.40	1.07	3.80	1.08
Standard Eleven	Blinded	4.50	0.83	4.20	0.74
Standard Twelve	Blinded	4.40	0.63	3.70	0.89

Standard One (Blinded): Incorporating Safety Procedures When Handling, Operating, and Maintaining Tools and Machinery, Handling Materials, Utilizing Personal Protective Equipment, Maintaining a Safe Work Area, and Handling Hazardous Materials and Forces

The mean competence score for standard one was $M = 4.96$, with a standard deviation of $SD = 0.19$. The aggregated level of importance was $M = 4.60$, with a standard deviation of $SD = 0.56$. Most respondents ($f = 26$) reported standard one as very important and felt competent to incorporate the skills into their lessons. One participant ($f = 1$) indicated that standard one was very important but only felt somewhat competent when including the standard in their lesson. One f*n* = 1) teacher reported standard one as important and felt competent in incorporating it into their agricultural mechanics lessons.

Standard Two (Blinded): Instructing Students to Utilize Power Tools to Construct and Maintain Systems Within the Agriculture Industry

The mean competence score for standard two was $M = 4.40$, with a standard deviation of $SD = 0.46$. The aggregated level of importance was $M = 4.60$, with a standard deviation of $SD = 0.73$. Participants ($f = 15$) indicated standard two to be very important while feeling very competent in

teaching it in their classroom. Five (f = 6) teachers indicated that standard two was very important and reported that they felt competent in teaching the standard. Four teachers (n = 4) reported standard two as both important and felt competent in incorporating the standard of their teaching. Participants (f = 4) indicated that using power tools for constructing and maintaining systems was important, although they only felt somewhat competent in teaching these concepts.

Standard Three (Blinded): Properly Using Metal Fabrication Tools and Equipment in SBAE Classrooms

The mean competence score for standard three was M = 4.60, with a standard deviation of SD = 0.57. The aggregated level of importance was M = 3.70, with a standard deviation of SD = 0.96. Seven teachers (n = 7) considered the standard important and felt competent. Six teachers (f = 6) believed standard three was important and felt competent when teaching students. Five teachers (f = 5) reported the standard as somewhat important and felt competent. Four teachers (f = 4) indicated they felt somewhat competent and believed the standard was important. Three teachers (f = 3) reported that the standard is somewhat important and felt somewhat competent when teaching the skills addressed in the learning standard. Teachers reported the standard as somewhat important (f = 3) but thought they needed more confidence in applying it in their curricula.

Standard Four (blinded) Students Will Be Able to Identify Electrical Hazards and Explain Ways to Avoid or Minimize Them in Agricultural Construction

The mean competence score for standard four was M = 4.80, with a standard deviation of SD = 0.44. The aggregated level of importance was M = 3.90, with a standard deviation of SD = 0.97. In contrast to teachers' competency levels, the importance of the standard was of less concern and was supported by the clustering of responses using the standard deviation of scores. Nine teachers (f = 9) thought standard four was important and felt competent in incorporating it into their curriculum. Seven (f = 7) reported that standard four was very important while feeling competent with teaching the standard. Increasing levels of agreement among teachers showed that four fn = 4) thought standard four to be very important and felt somewhat competent to teach it, and four (f = 4) indicated the standard was important and competent. Two teachers (f = 2) believed the standard was very important but only felt slightly competent in the associated skills, and two teachers (f = 2) found standard four to be important while feeling somewhat competent in teaching the standard. One teacher (f = 1) described the standard as important and felt slightly competent.

Standard Five (blinded): Recommended Maintenance Techniques for Troubleshooting Industrial Maintenance Issues in Various Types of Machinery

Standard five's mean competence score was M = 4.40, with a standard deviation of SD = 0.98. The aggregated level of importance was M= 3.60, with a standard deviation of SD = 0.98. Seven teachers (f = 7) felt the standard was important and competent to teach the standard, while six participants (f = 6) found standard five to be very important and competent. Four teachers (f = 4) showed the standard to be very important and felt somewhat competent. Three participants (f = 3) reported standard five as important. However, they only felt slightly competent when teaching

maintenance procedures, and three teachers ($f = 3$) indicated that standard five was somewhat important and felt somewhat competent. Three teachers ($f = 3$) reported standard five as important and somewhat competent when embedding this standard in their agricultural mechanics curricula. Two teachers ($f = 3$) stated that standard five was very important and felt competent.

Standard Six (blinded): Develop Students' Skills To Describe The Difference Between System Grounding and Agricultural Wiring

Standard six's mean competence score was $M = 4.30$, with a standard deviation of $SD = 1.07$. The aggregated level of importance was $M = 3.40$, with a standard deviation of $SD = 1.18$. Seven teachers ($f = 7$) reported standard six as very important. They also felt very competent in teaching the skills, and four ($f = 4$) teachers claimed standard six to be very important and felt somewhat competent. Three teachers ($f = 3$) indicated standard six was important and felt somewhat competent, and three ($f = 3$) teachers indicated standard six to be very important and felt competent when teaching the standard. Three teachers ($f = 3$) reported standard six to be very important in addition to feeling slightly competent in their ability to incorporate it into their lessons. In contrast, two participants ($f = 2$) indicated standard six as somewhat important while feeling slightly competent. One teacher ($f = 1$) believed the standard to be important but did not feel competent in teaching it, one teacher ($f = 1$) reported the standard to be important and felt slightly competent, one ($f = 1$) felt that standard six was not important but felt somewhat competent. Individual teachers believed that standard six was slightly important and felt somewhat competent ($f = 1$), the standard was somewhat important and somewhat competent ($f = 1$), and one ($f = 1$) responded that the standard was somewhat important and felt competent.

Standard Seven (blinded): Students Will Identify Factors to Consider In Selecting Building Materials For Agricultural Structures

Standard seven's mean competence score was $M = 3.90$, with a standard deviation of $SD = 1.18$. The aggregated level of importance was $M = 4.40$, with a standard deviation of $SD = 0.77$. Ten teachers ($f = 10$) reported standard seven as very important. They felt very competent; five teachers ($f = 5$) ranked this standard to be important and felt competent in teaching, and three teachers ($f = 3$) indicated standard seven to be somewhat important and felt somewhat competent, and three ($f = 3$) claimed standard seven to be very important and indicated themselves as somewhat competent in teaching it. Two teachers ($f = 2$) considered standard seven very important while feeling competent. Two teachers ($f = 2$) stated this standard as important to teach and felt very competent. One teacher ($f = 1$) indicated this standard to be somewhat important, whereas they thought they needed to be more competent; one teacher ($f = 1$) stated the standard to be important, though they did not feel competent. One teacher ($f = 1$) reported standard seven as very important and felt slightly competent.

Standard Eight (blinded): Students Will Explain and Demonstrate Safety Techniques for Using Oxy-fuel Equipment, Including Setting Up and Shutting Down, Lighting and Adjusting a Torch, Disassembling The Equipment, Changing Cylinders, Cutting Straight Lines and Square Shapes, Piercing and Slot Cutting

Standard eight's mean competence score was $M = 4.40$, with a standard deviation of $SD = 0.62$. The aggregated level of importance was $M = 3.93$, with a standard deviation of $SD = 0.83$. Nine ($f = 9$) respondents indicated this standard to be important and felt competent to teach the skills related to the standard. Six teachers ($f = 6$) reported the standard to be very important and very competent, and four ($f = 4$) teachers indicated this standard to be very important but only felt somewhat competent. Four ($f = 4$) respondents reported standard eight to be very important and felt competent, and two ($f = 2$) teachers indicated the standard as important and felt slightly competent in teaching. Two teachers ($f = 2$) believed standard eight to be somewhat important and felt competent. In contrast, one ($f = 1$) respondent reported the standard as important and felt very competent.

Standard Nine (blinded): Students Will Be Able To Identify Tools Used For Electrical Wiring and Demonstrate Their Use

Standard nine's mean competence score is $M = 3.87$, with a standard deviation of $SD = 1.14$. The aggregated level of importance was $M = 4.60$, with a standard deviation of $SD = 0.57$. Seven ($f = 7$) teachers reported standard nine to be very important and felt very competent. Five teachers ($f = 5$) indicated standard nine as important and competent to teach. In comparison, five teachers ($f = 5$) indicated standard nine to be very important and felt competent when teaching the skills of the standard. Three teachers ($f = 3$) reported standard nine as very important and felt somewhat competent. Three teachers ($f = 3$) indicated that standard nine was important and felt very competent when incorporating electrical tool identification into their lessons. Two teachers ($f = 2$) indicated standard nine as important. They felt somewhat competent, and one teacher ($f = 1$) responded that they believed the standard was important but needed to feel more competent when teaching the skills. One teacher ($f = 1$) believed standard nine to be very important but needed to feel more competent. One teacher ($f = 1$) reported that standard nine was very important but only felt slightly competent.

Standard 10 (blinded): Calculate Equipment and Workspace Requirements for Building Agricultural Structures

Standard 10's mean competence score was $M = 4.40$, with a standard deviation of $SD = 1.07$. The aggregated level of importance was $M = 3.80$, with a standard deviation of $SD = 1.08$. Eight teachers ($f = 8$) believed Standard 10 was very important and felt very competent. Five teachers ($f = 5$) ranked Standard 10 as important and felt competent when teaching students how to calculate equipment and workspace requirements for agricultural structures. Three teachers ($f = 3$) responded that the standard was important while feeling slightly competent when teaching, and three teachers ($f = 3$) believed the standard was very important and felt somewhat competent. Three teachers ($f = 3$) indicated that Standard 10 was very important and felt competent. Two teachers ($f = 2$) believed Standard 10 to be important in addition to feeling somewhat competent in their ability to incorporate it into their lessons; two teachers ($f = 2$) reported Standard 10 as somewhat important while feeling competent to teach the standard. One teacher ($f = 1$) indicated that Standard 10 was important and felt slightly competent. One teacher ($f = 1$) reported the standard as very important and felt slightly competent.

Standard 11 (blinded): Students Will Participate in Supervised Agricultural Experiences (SAE) and Work-Based, Experiential, and Service Learning

The mean competence score for Standard 11 was $M = 4.50$, with a standard deviation of $SD = 0.83$. The aggregated level of importance was $M = 4.20$, with a standard deviation of $SD = 0.74$. Ten teachers ($f = 10$) believed Standard 11 was very important and felt very competent in directing SAE and service-learning experiences. Six teachers ($f = 6$) thought Standard 11 was very important and felt competent in teaching the standard. Three teachers ($f = 3$) indicated Standard 11 as somewhat important. They felt competent to incorporate it into their lessons, and three teachers ($f = 3$) reported standard eleven as important while also feeling competent. Two teachers ($f = 2$) reported that Standard 11 was important and felt somewhat competent. In comparison, two teachers ($f = 2$) ranked Standard 11 as very important but only felt somewhat competent when teaching SAE and service-learning experiences. Two teachers ($f = 2$) believed standard eleven was important and felt very competent.

Standard 12: (blinded): Identify Specific Tools Used on Agricultural Engines and Demonstrate Their Use

The mean competence score for Standard 12 was $M = 4.40$, with a standard deviation of $SD = 0.63$. The aggregated level of importance was $M= 3.70$, with a standard deviation of $SD = 0.89$. The largest group of teachers ($f = 10$) believed that standard twelve was important, and they felt competent to teach tools used for agricultural engines. Five teachers ($f = 5$) indicated that Standard 12 was very important. They felt competent to teach, and four teachers ($f = 4$) believed standard twelve was very important but only felt somewhat competent. Four teachers ($f = 4$) reported that standard twelve was very important and felt very competent when teaching. Two teachers ($f = 2$) believed standard twelve was slightly important and felt competent to teach the skills. Two teachers ($f = 2$) thought the standard was important and were only somewhat competent. One teacher ($f = 1$) reported that the standard was important but needed to feel more competent.

Conclusion, Implications, and Recommendations

Conclusions

Teachers felt that standards connected to General Safety (Standard 1) and Electrical Wiring Tools (Standard 9) were very important. In comparison, nine of the remaining ten standards (2, 3, 4, 5, 7, 8, 10, 11, & 12) were considered important. The highest level of importance, with the least variability, is being put on the standard covering general safety; this supports the work of Hancock et al. (2023), which suggests that safety is the most significant concern for SBAE teachers. The question has been raised in research presentations as to the fidelity of the statement and if it is part of a learned response where teachers feel anything less than very important would not be appropriate, no matter their honest opinions (Hancock et al., 2022). Standard six did not meet the determined threshold for this study: "Describe the difference between system grounding and equipment grounding related to agricultural wiring." Participants rated it as somewhat important.

Using the same conventions of interpreting the true limits for interval measurement type data (Lindner & Lindner, 2024), teachers felt very competent in their ability to incorporate five of the standards: General Safety (Standard One), Power Tools (Standard Two), Metal Fabrication Tools (Standard Three), Electrical Hazards (Standard Four), and Supervised Agricultural Experience/Work-based Learning (Standard Eleven). They also reported they were competent in incorporating the remaining seven standards: Maintaining and Troubleshooting Machines (Standard Five), System Grounding and Equipment Grounding (Standard Six), Selecting Building Materials (Standard Seven), Oxy-Fuel Related (Standard Eight), Electrical Wiring Tools (Standard Nine), Equipment and Workspace requirements for Structures (Standard Ten), and Tools for Engines (Standard Twelve). Both competent and very Competent were determined to be appropriate levels for these teachers in their self-determined competencies.

Implications and Recommendations

The average participant in this study was a white male teacher who had been teaching for six to eleven years, and either was currently teaching or had taught agricultural mechanics in the past. This finding does not represent the changed demographics of SBAE teachers as has been reported by (McKibben et al., 2022a), indicating that either Alabama's teacher demographics do not mirror the national trends, or more likely, those who would respond to an instrument about agricultural mechanics are more likely to be male, older, and white. Future work should address why or if either Alabama or the discipline of agricultural mechanics remains male-dominated.

The teachers in this study overwhelmingly reported that safety was very important. These unsurprising results of this single-state paper support the larger body of evidence that SBAE teachers, specifically those teaching agricultural mechanics, respond to any question about safety and its importance with quick and written responses. While safety is important, and it would not be wise to suggest in any form that it was not, there is the possibility that our development of a culture of safety within agricultural mechanics has been more focused on the recognition of safety as important and less on the implementation of long-term safety habits as our industry partners would suggest would be appropriate. After all, what does it mean to, as standard one says: "Incorporate safety procedures in handling, operating, and maintaining tools and machinery; handling materials; utilizing personal protective equipment; maintaining a safe work area; and handling hazardous materials and forces." While this standard appears specific in its prolific use of vocabulary, it does little to address what any of those words mean or how to address the standard pragmatically. It has been shown that when SBAE teachers speak about safety, they speak in housekeeping and safety glasses, not in developing a safety culture and safe decision-making.

The standard not reaching the minimum threshold for importance: "Describe the difference between system grounding and equipment grounding related to agricultural wiring," when compared to the other eleven standards, appears to be the most specific and relatively esoteric. It would be safe to say that SBAE teachers not teaching specifically about electrical motors or motor controllers would never need to reach this standard. This standard is singular in its specificity, and though likely crucial in specific areas where electric motors and motor controls are prevalent, we determined that its overly detailed characteristic results in some SBAE teachers viewing it as less important.

Though not originally part of this study, these objectives could be viewed from the lens of specificity and generality. One interpretation of the data is that rankings of importance should be more about the standards of importance to an agricultural industry. Instead, the rankings may be more of a representation if the standard is written in a general enough way that local decisions can be made regarding how to interpret the meaning of the standard in the norms of local agricultural industries. What is done in a region of all-row cropping should look different than what is done in an area of predominantly ruminant animal agriculture, and levels of variability need to be allowed in the writing of the standards. Further study should be conducted on the level of specificity and prescription, as well as SBAE teachers' views on the importance of that standard.

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