Factors Influencing Woodworking Knowledge, Safety Preparation, and Instructional Confidence Among Georgia SBAE Agricultural Mechanics Instructors

by

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Abstract

Woodworking instruction has historically served as an important component of School-Based Agricultural Education (SBAE) agricultural mechanics programs; however, limited research has examined how agricultural mechanics instructors develop woodworking knowledge, safety preparation, confidence, and instructional decision-making related to stationary woodworking machinery. Guided conceptually by Bandura's (1997) self-efficacy theory, the purpose of this dissertation was to investigate Georgia high school SBAE agricultural mechanics instructors' experiences with woodworking preparation, perceptions of implementing woodworking machinery, and confidence in operating and teaching woodworking equipment.

A descriptive-correlational research design was employed using questionnaire data collected from Georgia SBAE agricultural mechanics instructors (N = 91). The dissertation consisted of three manuscript-style studies. Article one examined the developmental experiences through which instructors acquired woodworking knowledge, skills, and safety preparation. Article two investigated perceptions of the instructional effectiveness of woodworking machinery and the factors influencing implementation decisions. Article three examined the relationships among safety preparation, confidence, and perceived instructional effectiveness.

Findings indicated that instructors developed woodworking knowledge and safety preparation through a combination of high school agricultural education coursework, collegiate experiences, professional development, employment experiences, and informal learning opportunities. Respondents reported high levels of perceived safety preparedness and confidence in both using and teaching woodworking machinery.

Stationary woodworking equipment, including table saws, miter saws, band saws, drill presses, and sanders, were identified as the most instructionally valuable woodworking machines. Confidence emerged as a central factor associated with instructors' perceptions of woodworking instruction, with confidence in the use and operation of woodworking machinery demonstrating a strong positive relationship with confidence in teaching woodworking machinery ($r = .935$, $p < .001$). Safety training experiences were significantly related to instructor confidence, and confidence was positively associated with perceived instructional effectiveness. Perceptions of danger and liability remained important considerations but were not significant predictors of instructional confidence.

The findings suggested that training experiences, perceived safety preparedness, confidence, instructional decision-making, and perceived instructional effectiveness are interrelated constructs among Georgia SBAE agricultural mechanics instructors. Recommendations are provided for SBAE leaders, teacher educators, and agricultural mechanics instructors to strengthen preparation in woodworking, safety training, and instructional confidence.

Artificial Intelligence (AI) Use Disclosure Statement

In the preparation of this thesis/dissertation, the following Artificial Intelligence (AI) tools were used: Microsoft Co-Pilot. These tools were used primarily to check spelling, grammar, and formatting. The author acknowledges full responsibility for the intellectual content of this work and has ensured that all AI-assisted sections have been reviewed and revised for accuracy and appropriate academic style. All AI-generated content was reviewed and validated for relevance, appropriateness, and accuracy before incorporation into the final document to maintain the scholarly integrity of this research.

Digital Accessibility Disclosure Statement

In the preparation of this dissertation, the following digital accessibility tools were used to ensure this document complies with federal requirements: Microsoft Word and Adobe. The author acknowledges full responsibility for the intellectual content of this work and has made a good faith effort to comply with digital accessibility requirements in publishing, wherein the nature of the content does not significantly change in order to do so. Furthermore, all content has been reviewed and revised to meet these requirements prior to final publication.

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Chapter 1: Prologue

Introduction and Significance of the Study

A persistent challenge in school-based agricultural education (SBAE) is the shortage of teachers with the technical competence to deliver effective instruction in agricultural mechanics (Granberry et al., 2023; Hainline & Wells, 2019). Agricultural mechanics encompasses a broad spectrum of hands-on skills, including tool use and safety, metalworking and fabrication, electricity and wiring, small-engine and power-system maintenance, plumbing and irrigation, construction and carpentry, hydraulics and machinery systems, and the integration of emerging technologies (Georgia Agricultural Education, n.d.). These skills are essential for preparing students to enter the agricultural workforce with the technical proficiency required by modern agricultural industries. However, many preservice and early-career agricultural educators report limited confidence and experience in these areas, which is associated with their avoidance of high-risk or complex laboratory instruction (Blackburn et al., 2015; McKibben et al., 2022; Saucier & McKim, 2011). Similar findings were reported by Clemons et al. (2018), who identified continuing technical expertise and agricultural mechanics content needs among practicing agriscience teachers, suggesting that confidence gaps extend beyond preservice preparation into professional practice. Another example, Blackburn et al. (2015), found that preservice agricultural education teachers reported only moderate levels of readiness in agricultural mechanics, indicating gaps in both confidence and technical competence. This gap between program expectations and teacher preparation not only restricts student access to critical, applied learning opportunities but also undermines the alignment of SBAE programs with industry standards and workforce needs. Without adequately trained

SBAE teachers, agricultural education programs' capacity to meet global demands is limited, underscoring the critical need for research and strategies to strengthen teacher preparation in agricultural mechanics and to support the development of a skilled, employable workforce.

Agricultural mechanics has long been a core component of SBAE, providing students with hands-on opportunities to develop skills essential to modern agricultural careers. The field encompasses a range of technical competencies, including welding, metal fabrication, engine repair, electrical systems, hydraulics, and emerging technologies such as precision agriculture and automation (Albritton & Roberts, 2020; Hainline & Wells, 2019; Wells, Hainline, Rank, et al., 2021). These competencies are critical for workforce readiness and align with broader societal goals, including the number of youth and adults with relevant technical and vocational skills for employment, decent work, and entrepreneurship (Granberry et al., 2023; Wells & Hainline, 2021). Previous research has demonstrated that beginning agricultural education teachers frequently report concerns regarding their preparation for laboratory safety and health practices, emphasizing the importance of continued safety training throughout the teachers' professional careers (Hubert et al., 2001).

Despite the growing complexity and importance of agricultural mechanics, research consistently identifies a shortage of technically competent SBAE teachers. This shortage has implications not only for instructional quality and student skill development but also for workforce preparation and global development objectives. The following research examines the current state of teacher preparation in agricultural mechanics, identifying potential deficiencies, variation in training, concerns regarding confidence and self-efficacy, safety and laboratory challenges, and professional development needs. This research synthesizes empirical findings to contextualize the problem, support the analysis, and justify proposed approaches to strengthen agricultural mechanics instruction in SBAE programs.

Definitions

Agricultural Mechanics: The hands-on side of high school agriculture, where students learn to safely use, maintain, and repair the tools, machinery, and systems common on farms or in shops. This includes everything from woodworking and welding to small engines, electrical systems, hydraulics, and new farming technologies.

Agricultural Mechanics Instructor: A certified high school agricultural teacher who leads the hands-on, shop-based classes and lab activities.

Confidence: How sure a teacher feels about their ability to operate woodworking machinery, manage a safe shop, and effectively teach the material. For our purposes, this idea is closely tied to the concept of self-efficacy.

Perceived Instructional Effectiveness: A teacher's belief in their ability to teach woodworking concepts, skills, and safety in a way that truly helps students learn and stay engaged.

Professional Development: Training activities designed to help instructors assess their technical skills, safety knowledge, and teaching methods in agricultural mechanics. This can include workshops, in-service training, and certification programs that often count toward Professional Learning Units.

Professional Learning Units (PLUs): The official credits that all educators in Georgia must earn to renew their certification, obtained through participation in approved training and professional growth activities.

School-Based Agricultural Education (SBAE): The total Ag program at a high school that blends classroom learning, hands-on shop experience, and leadership skills developed through the FFA to prepare students for careers in agriculture.

Self-Efficacy: A person's belief in their self-reported confidence to succeed at a specific task. Based on Bandura's (1997) work, it is that "I can do this" feeling before the subject starts something.

Woodworking: A part of agricultural mechanics that focuses on designing and building projects with wood. The main goals are to develop skills and to learn to operate all tools and machinery safely.

Woodworking Floor Machinery: The large, stationary machines used for teaching in a school woodshop, such as table saws, band saws, drill presses, jointers, planers, and sanders.

Woodworking Machinery Self-Efficacy: An instructor's specific perceived confidence in their ability to operate the stationary floor woodshop machines safely, but also to effectively, teach students how to use them and manage the woodworking laboratory environment.

Workforce Readiness: Workforce readiness is defined as how well-equipped students are with the technical skills, safety awareness, and practical knowledge they need to step into a job in agriculture or a related technical field.

Framework

This three-manuscript dissertation was informed by Albert Bandura's Self-Efficacy Theory (Bandura, 1977, 1989, 1997), which proposes that individuals' beliefs in their ability to organize and execute actions required to manage prospective situations are strongly associated with behavior, persistence, motivation, and performance confidence. Bandura (1989) wrote, “self-efficacy is not merely a measure of one’s skill level; rather, it reflects one’s perceived competence to successfully perform tasks under varying conditions” (pp. 7-8). Within educational and occupational settings, Bandura (1997) stated that “self-efficacy is a critical psychological mechanism that is related to instructional decisions, willingness to engage in challenging tasks, and confidence in managing risk-intensive environments” (p. 67).

Specifically, questionnaire items addressing safety training experiences, woodworking preparation, and confidence in using and teaching woodworking machinery were conceptually aligned with the theory's emphasis on mastery experiences and efficacy beliefs. However, the study did not directly measure all components of self-efficacy theory, such as vicarious experiences, social persuasion, or physiological and emotional states. Therefore, Bandura's (1997) framework was used primarily as a lens for interpreting relationships among training experiences, confidence, and instructional practices rather than as a fully operationalized theoretical model. In the context of secondary agricultural education, woodworking instruction involves technical complexity, knowledge, and heightened safety risks, requiring instructors not only to possess technical competence but also to maintain confidence in operating equipment, teaching students safely, and managing laboratory environments. As a result, instructor self-efficacy is expected to relate to both the instructional choices made in woodworking laboratories and the instructor’s perception of their ability to operate stationary woodworking machinery with confidence.

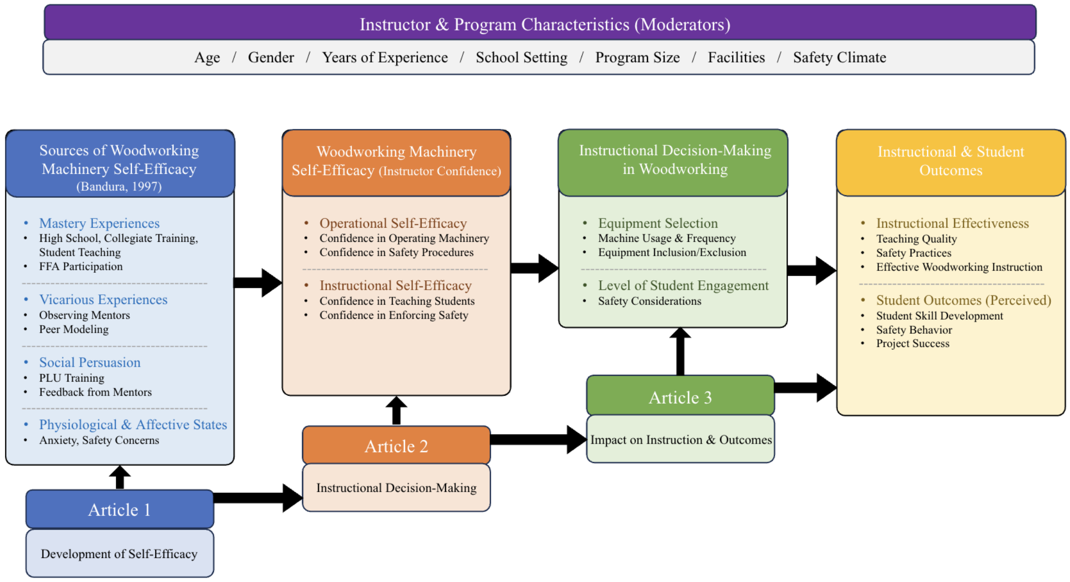

Figure 1.1. Conceptual framework grounded in Bandura's (1997) self-efficacy theory, illustrating how agricultural mechanics instructors' confidence in woodworking machinery develops through mastery, vicarious experiences, social persuasion, and affective states, and how this confidence applies to instructional decision-making, equipment selection, and perceived instructional effectiveness. Articles 1-3 examine sequential components of the model.

This dissertation conceptualizes woodworking machinery confidence as a specialized form of self-efficacy, referred to as woodworking machinery self-efficacy, encompassing instructors' perceived capability to operate woodworking floor machinery safely and effectively and to teach students proper operation and safety protocols. The three articles collectively examine the development, application, and associations of self-efficacy in woodworking machinery among Georgia high school agricultural mechanics instructors. Each manuscript addresses a distinct component of Bandura's (1997) theoretical model while progressively building toward a comprehensive understanding of instructor confidence and perceived instructional effectiveness in woodworking education.

Article 1

Article 1 investigated the sources of the development of woodworking knowledge, safety preparation, and confidence among Georgia SBAE agricultural mechanics instructors. This study aimed to identify where instructors develop woodworking competence, including safety knowledge, across relevant background variables.

Article 2

Article 2 investigated the factors influencing the instructional use of stationary woodworking machinery in Georgia SBAE agricultural mechanics programs' perceptions, decision-making, and barriers. It identified which machines are considered most instructionally effective and which factors predicted machine selection.

Article 3

Article 3 investigated the relationship between confidence, safety preparation, and perceived instructional effectiveness among Georgia SBAE agricultural mechanics instructors. The questionnaire tested how confidence predicts perceived instructional effectiveness and self-reported confidence, and examined the role of professional development.

Dissertation Purpose

The purpose of this dissertation is to determine the self-efficacy of SBAE instructors in Georgia high schools (9-12 grades) across various woodworking floor-machinery skills and confidence levels. The sources of these skills, and the instructors' comfort level with the equipment as a teaching tool, are also emphasized in this research.

Dissertation Organization

This dissertation is organized into five chapters. Chapter One contains the introduction, purpose, and frames the remaining chapters. Chapters Two, Three, and Four are individual articles related to the study of agricultural mechanics instructors and their confidence in woodworking skills. Chapter Five summarizes the articles, findings, and recommendations for application and further research.

Research Questions

The three articles investigate the development, application, and instructional impact of Georgia high school agricultural mechanics instructors' competence and confidence with woodworking machinery. Article 1 establishes a foundational understanding of how instructors acquire woodworking machinery skills and safety knowledge by examining the developmental contexts that shape their preparation, the perceived value of those experiences, differences across instructor characteristics, and gaps in safety training. Building on this foundation, Article 2 shifts toward instructional practice by identifying which woodworking floor machines instructors perceive as the most effective teaching tools and exploring the criteria, confidence-based decision-making, and barriers that are associated with equipment selection for classroom instruction. Finally, Article 3 extends the investigation by examining (a) how participation in professional development is associated with the instructors' perceptions of confidence, (b) how confidence relates to perceived instructional effectiveness and perceived student safety and skill development, and (c) how instructors perceive the role of confidence in instructional delivery and safety enforcement. The research questions listed below guided this study.

Article 1

1. What are the primary contexts (high school instruction, FFA, collegiate coursework, professional training, and personal experience) through which Georgia agricultural mechanics instructors report developing woodworking machinery skills and knowledge?

2. How do SBAE agricultural mechanics instructors perceive these developmental contexts in contributing to their confidence in teaching and using woodworking machinery?

3. How do SBAE agricultural mechanics instructors define their sources of knowledge in agriculture mechanics in comparison to instructor personal and professional characteristics (e.g., years of teaching experience, school setting, age, gender, and program size)?

4. To what extent do SBAE agricultural mechanics instructors perceive their levels of woodworking safety preparation?

Article 2

1. Which woodworking floor machines do Georgia agricultural mechanics instructors identify as instructionally effective for teaching woodworking concepts, skills, and safety?

2. What criteria do SBAE agricultural mechanics instructors report using when determining whether a woodworking machine is appropriate for classroom instruction (e.g., safety risk, level of danger, level of difficulty, liability, and school support)?

3. To what extent do SBAE agricultural mechanics instructors' confidence in teaching machine operation and safety predict the likelihood of selecting specific machines for instruction?

4. What potential barriers (e.g., liability concerns, training level, equipment condition, facility availability, administrative restrictions) are associated with whether SBAE agricultural mechanics instructors choose to include or exclude specific woodworking machines in instruction?

Article 3

1. To what extent does professional development participation (e.g., PLU training frequency and type) predict SBAE agricultural mechanics instructors' confidence in woodworking machinery operation and safety management?

2. To what extent does the SBAE agricultural mechanics instructor's confidence in woodworking machinery operation and safety predict perceived instructional effectiveness in teaching woodworking concepts and skills?

3. What is the relationship between the SBAE agricultural mechanics instructors' confidence levels in safety practices when teaching versus when using woodworking machinery?

Limitations

Several limitations should be considered when reviewing the results, interpreting the findings, and drawing conclusions from this study. These main limitations concern the use of self-reported data, the design of the rating scales, and the size of the specific group of Georgia agricultural mechanics instructors.

First, all three articles are based on self-reported data from high school agricultural mechanics instructors in Georgia about their self-reported skills, confidence, and teaching practices. As Bandura (1997) pointed out, how capable we think we are is not always a perfect reflection of our actual performance. Instruments rely on participants being honest and self-aware of their self-reported capabilities, and there is no certainty that every answer was completely truthful or objective. This is a well-known issue in agricultural education research. Other studies have found that teachers' perceptions of self-reported confidence can be associated with a desire to look good, a fear of being judged, or simply an incomplete recollection of past events (e.g., Blackburn et al., 2015; Dyer & Andreasen, 1999; McKibben et al., 2022; Trickett et al., 2023). For instance, concerns about safety and liability can affect how teachers discuss what happens in their agricultural mechanics labs (Dyer & Andreasen, 1999), and reports of confidence are often based on self-assessment rather than a formal evaluation (McKibben et al., 2022; Trickett et al., 2023). Therefore, the findings of this study should be viewed as a self-reflective snapshot of teachers' perceptions, not as conclusive data on their technical skills, safety records, or the extent to which their students learned.

Second, the instruments used in this study relied on Likert-type and similar rating scales to measure constructs such as confidence, perceived value of training contexts, perceived instructional effectiveness, and the importance of various criteria in equipment selection. Likert-type scales were used to measure factors such as confidence and the perceived value of different training methods. These scales are standard practice in this type of research (e.g., Brune et al., 2020; Granberry et al., 2022; Hainline & Wells, 2019; McKim & Saucier, 2012), but they inherently involve subjectivity. Agricultural education researchers routinely proceed under this estimation, treating scale points as roughly equal increments while acknowledging the underlying individuality (e.g., Brune et al., 2020; Granberry et al., 2022; McKim & Saucier, 2012). Therefore, the precision of reported mean scores, comparisons across instructor subgroups, and estimates of relationships among variables in Articles 1, 2, and 3 may be affected by individual differences in how SBAE agricultural mechanics instructors interpret and use the scale points.

The study's scope also presents some limitations. When the data were collected, 145 agricultural mechanics instructors in Georgia met the criteria for the sample cohort. This relatively small number of potential participants limited the sample size and, in turn, the statistical power of some analyses, especially when data were broken down into smaller groups by experience level or school size. This is not an uncommon problem in agricultural mechanics research, where small subgroups can make it hard to draw strong conclusions or detect subtle differences (e.g., Clark et al., 2021; Granberry et al., 2023; McKim & Saucier, 2013; Wells, Hainline, Rank, et al., 2021). Also, because the focus was only on Georgia SBAE agricultural mechanics instructors, specifically on woodworking machinery, the findings might not apply to instructors in other states, in programs with substantially different shops, or to those teaching other components within agricultural mechanics.

Finally, this study captures a single moment in time using one method of data collection. As Lindner et al. (2001) discussed, survey-based research can be affected by those who choose to respond and those who do not. Although appropriate steps were taken to design a reliable instrument and to encourage teacher participation, the design cannot fully account for potential differences between respondents and nonrespondents, or for changes in instructors' confidence, practices, or professional development over time.

These combined limitations suggest that the findings should be viewed with some caution. The results offer a valuable look into the microcosm of how Georgia SBAE agricultural mechanics instructors perceive their training, confidence, and decision-making, fitting within the framework of self-efficacy theory (Bandura, 1997) and the larger body of research in our field (e.g., Burris et al., 2005; Chumbley et al., 2018; McKim & Saucier, 2011; Wells & Hainline, 2021). However, they are not direct measures of teachers' technical skills, safety compliance, or their students' actual learning. Recommendations for future research building on this work could incorporate methods such as direct observation, performance-based assessments, or longitudinal studies that follow SBAE agricultural mechanics instructors over several years (e.g., Granberry et al., 2023; McKim & Saucier, 2013; Trickett et al., 2023). A larger, multistate sample would also help address these limitations and give an even clearer picture of woodworking instruction in agricultural mechanics across the United States.

Chapter 2: Sources of Woodworking Knowledge Development, Safety Preparation, and Confidence Among Georgia SBAE Agricultural Mechanics Instructors

Abstract

Agricultural mechanics instruction remains a foundational component of School-Based Agricultural Education (SBAE) programs, yet concerns persist about teachers' preparation to teach woodworking content safely and effectively. The purpose of this study was to examine the developmental contexts through which Georgia SBAE agricultural mechanics instructors acquired knowledge of woodworking machinery, perceived developed confidence in using and teaching woodworking equipment, and perceived their preparedness to safely supervise students in woodworking laboratory environments. Guided conceptually by Bandura's (1997) Self-Efficacy Theory, the study investigated the relationships among instructors' educational experiences, participation in professional development, woodworking confidence, and safety preparation.

A descriptive survey research design was used to collect data from Georgia SBAE agricultural mechanics instructors during the 2025-2026 academic year. A census sampling approach was employed, and all eligible agricultural mechanics instructors identified through Georgia Agricultural Education Department records were invited to participate. After data screening procedures, (N = 91) usable responses were retained for analysis. Data were collected using a researcher-developed questionnaire that examined sources of woodworking knowledge, confidence in using and teaching woodworking machinery, safety preparation experiences, and selected personal and professional characteristics.

Results indicated that instructors developed woodworking knowledge through multiple experiential contexts, including secondary agricultural education, collegiate coursework, professional development activities, occupational experiences, and self-directed learning opportunities. Collegiate instruction, student teaching experiences, and professional learning opportunities were identified as important contributors to confidence in using and teaching woodworking machinery. Differences in perceived sources of knowledge development were observed across selected instructor characteristics, suggesting that developmental pathways vary among agricultural mechanics instructors. Participants generally reported positive perceptions of their woodworking safety preparation; however, there was variation in the timing, frequency, and type of safety training received.

The findings suggest that woodworking competency, instructional confidence, and safety preparedness are developed through cumulative patterns consistent with both formal and informal learning experiences. Recommendations include strengthening woodworking instruction within teacher preparation programs, expanding professional development opportunities focused on woodworking machinery and safety, and increasing emphasis on machine-specific safety training. Future research should examine the relationships among instructor confidence, instructional practices, and the instructors' perceptions of safety in agricultural mechanics laboratories.

Key Words

Agricultural Mechanics Education, School-Based Agricultural Education (SBAE), Woodworking Safety, Teacher Preparation, Self-Efficacy, Professional Development,

Laboratory Safety, Technical Skill Development, Agricultural Education Teachers, and Woodworking Machinery.

Introduction and Review of Literature

Agricultural mechanics has long been recognized as a core component of school-based agricultural education (SBAE), providing secondary students with opportunities to develop technical skills, apply scientific and mathematical theories, and engage in realistic problem-solving tasks (Barrick, 1989; Love, 1978; Parr & Edwards, 2004). Within the boundaries of agricultural mechanics, woodworking, and the use of stationary floor machinery, such as table saws, band saws, planers, and jointers, remain prominent features of many high school agriculture mechanics programs, as reflected in the Georgia Agricultural Mechanics Technology I standards emphasizing woodworking safety, tool use, and project construction (Georgia Agricultural Education, n.d.). These settings are not only a conduit for skills training; they also function as laboratories where students integrate academic knowledge with hands-on application, aligning with the comprehensive agricultural education model and the longstanding emphasis on experiential learning (Baker & Robinson, 2016; Baker et al., 2012; Coleman et al., 2024; Roberts, 2006).

Recent work in agricultural education underscores the importance of lab and project-based learning for building students' agricultural literacy. Studies of fabrication labs and problem-based settings have shown that well-designed technical activities improve students' understanding and higher-order thinking (Coleman et al., 2020, 2021; Rice & Merrick, 2023). Research on agricultural literacy and STEM integration also identified SBAE courses as key places where youth interpret complex agricultural systems and link classroom content to real-world problems (Brune et al., 2020;

Charoenmuang et al., 2024; Gawryla & Curry, 2022; Volk et al., 2025). Parents likewise value school-based, hands-on agricultural learning opportunities for their children (Miller et al., 2025). In this context, woodworking laboratories can play a significant role in developing students' technical skills, problem-solving abilities, and engagement with science and engineering practices.

Woodworking labs and stationary machines also create serious safety and management challenges. Using cabinet saws, planers, and similar tools carries a high risk of severe injury if equipment is misused, guards are removed, or supervision is weak. Studies have shown that teachers are critical for setting and enforcing safety rules, modeling correct tool use, and managing busy lab environments (McKim & Saucier, 2011, 2013; Saucier et al., 2014). More recent agricultural safety research also emphasized that comprehensive laboratory safety includes protection against occupational hazards, such as excessive noise exposure and hearing loss, in addition to the proper use of safety equipment (Hancock et al., 2023). Well-prepared teachers with strong technical and safety skills can design meaningful projects, anticipate risks, and prevent accidents. In contrast, teachers with limited preparation or low confidence may avoid certain activities, restrict use of higher-risk tools, or struggle to maintain consistent safety expectations (Blackburn et al., 2015; McKibben et al., 2022; Tummons et al., 2017). In addition to teacher preparation, recent agricultural mechanics research suggested that instructors' perceived competence varies across agricultural mechanics content standards, reinforcing the importance of content-specific technical preparation rather than treating agricultural mechanics as a single, homogeneous discipline (Faulk et al., 2024).

Concerns about how well SBAE teachers are prepared in agricultural mechanics are well-documented. Studies of preservice and early-career teachers have shown wide differences in how many and the level of depth of the mechanics courses they complete, as well as in how ready they feel to teach and manage mechanics labs (Burris et al., 2005; Byrd, Anderson, & Paulsen, 2015; Clark et al., 2021; Trickett et al., 2023). National and regional studies also pointed to ongoing professional development needs in technical content, lab management, and safety (Hainline & Wells, 2019, 2024; McKim & Saucier, 2011; Toft et al., 2021; Wells & Hainline, 2021; Wells, Hainline, Rank, et al., 2021). Similarly, Croom et al. (2026) identified agricultural mechanics as one of the highest priority technical professional development needs reported by agricultural education teachers throughout the southeastern United States, emphasizing the continued need for targeted technical training. In addition, research on the adequacy of tools and equipment showed that limited resources can be associated with the teachers' instructional choices and their sense of competence in teaching agricultural mechanics (Byrd et al., 2015; McCubbins et al., 2016; McCubbins et al., 2017).

Much of the existing research on agricultural mechanics preparation and lab management treated the field as a single, broad area that includes welding, metal fabrication, power and machinery, structures, and electrical systems (Hainline & Wells, 2019; Wells, Hainline, Smalley, et al., 2021; Whitehair et al., 2020). Far fewer studies focused specifically on woodworking and stationary woodworking machinery, even though these tools require unique skills and pose distinct safety concerns. Most safety-related research has examined mechanics labs in general (e.g., Chumbley et al., 2018;

Saucier & McKim, 2011; Saucier et al., 2014), making it difficult to determine how teachers are specifically prepared for and supported in teaching woodworking.

Recent research has further demonstrated that preservice agricultural educators' self-efficacy in agricultural mechanics develops through authentic laboratory experiences and opportunities to practice technical skills. McKibben et al. (2022) found that hands-on mechanics experiences were associated with increased perceptions of competence and confidence among preservice agricultural education teachers, reinforcing Bandura's (1997) assertion that mastery experiences serve as the strongest source of self-efficacy. McKibben et al. (2022) demonstrated that authentic agricultural mechanics laboratory experiences were associated with increased self-efficacy among preservice teachers, providing empirical support for Bandura's (1997) proposition that mastery experiences are the strongest source of efficacy beliefs. From an experiential and constructivist perspective, teachers' woodworking competence and confidence develop over time through a range of experiences rather than from a single source. Experiential learning theory holds that people build expertise by repeatedly engaging in concrete experiences, reflecting on them, forming concepts, and trying out new approaches across different settings (Baker & Robinson, 2016; Baker et al., 2012; Dewey, 1938; Kolb, 1984; Roberts, 2006). In SBAE, studies have shown that agricultural mechanics skills and self-efficacy are shaped by a mix of high school classes, college labs, supervised agricultural experiences, FFA activities, and in-service professional development (Albritton & Roberts, 2020; Gorter & Swan, 2018; McKibben et al., 2022; Wells et al., 2013). Research with preservice and in-service teachers also highlighted the value of reflective practice and structured learning opportunities for strengthening technical confidence and influencing instructional choices (Coleman et al., 2020, 2021; Schon, 1983; Toombs et al., 2022). Likewise, McKibben et al. (2022) found that authentic shop experiences were associated with increases in agricultural mechanics self-efficacy among preservice teachers, providing contemporary empirical support for experiential learning and Bandura’s (1997) mastery experiences.

Despite these insights, there remains little empirical detail on how SBAE instructors actually develop their woodworking machinery skills and safety knowledge. Researchers know very little about the relative impact of high school Ag mechanics courses, FFA involvement, college classes, professional training (e.g., workshops, certifications), and personal or informal experiences on teachers’ current woodworking competence. Hancock et al. (2023) emphasized that agricultural mechanics safety extends beyond equipment operation to include occupational hazards such as hearing conservation, demonstrating the breadth of laboratory safety responsibilities faced by SBAE instructors. Similarly, few studies have explored how these experiences differ by teacher characteristics (e.g., years of experience, school setting, age, gender, program size) or how SBAE agriculture mechanics teachers themselves view gaps in their woodworking safety preparation.

Agricultural mechanics knowledge development is often shaped through a combination of formal instruction, experiential learning, mentorship, occupational experiences, and repeated exposure to technical applications throughout an instructor’s educational and professional career. As a result, instructors may attribute their agricultural mechanics knowledge to different developmental contexts depending upon their personal backgrounds and professional experiences. For example, instructors with extensive teaching experience may rely more heavily on experiential learning gained through years of laboratory instruction and program management. In contrast, less experienced teachers may report collegiate coursework and recent professional development opportunities as more influential sources of knowledge acquisition. Similarly, instructors from rural school settings may report stronger exposure to woodworking and agricultural mechanics through community, family, or agricultural work experiences than instructors teaching in suburban or urban environments.

The development of woodworking machinery knowledge among SBAE agricultural mechanics instructors appeared to emerge through multiple overlapping experiential pathways rather than a single instructional source. Agricultural mechanics knowledge and technical competence are often shaped through formal instruction, repeated hands-on experiences, mentorship, supervised laboratory participation, occupational exposure, and nonformal learning environments. Consequently, instructors may attribute their woodworking preparation to a combination of educational, professional, and personal experiences accumulated throughout their academic and teaching careers. Previous research has also demonstrated the continuing need for technical agricultural mechanics training among SBAE instructors. Clemons et al. (2018) identified measurable differences in teachers’ perceived competence across agricultural mechanics content areas, suggesting that professional development should address technical skill deficiencies that may influence instructional confidence and implementation decisions. Faulk et al. (2024) further reported variation in teachers’ perceived competence across agricultural mechanics, standards, reinforcing the need for targeted professional development in specific technical content areas.

Gender differences were also examined, given the historically male-dominated nature of agricultural mechanics education and the potential association of prior access to woodworking and technical training. Prior literature has suggested that participation in agricultural mechanics coursework, extracurricular technical experiences, and agricultural work opportunities may vary across characteristic groups, potentially shaping perceptions of preparedness and confidence in agricultural mechanics instruction (Burris et al., 2005; McKim & Saucier, 2013; Rasty et al., 2017; Trickett et al., 2023). Additionally, program size and teaching level were examined because larger agricultural education programs and programs serving both middle and high school students may provide instructors with greater opportunities for repeated exposure to agricultural mechanics instruction, laboratory management, and woodworking equipment usage, therefore influencing knowledge development and instructional confidence (Clark et al., 2021; Hainline & Wells, 2024). Understanding the gender composition of SBAE agricultural mechanics instructors provides important context when examining differences in agricultural mechanics preparation, woodworking experience, confidence levels, and perceived safety preparedness among instructors (Clark et al., 2021; Trickett et al., 2023).

These questions are especially important in Georgia, where SBAE programs span rural, suburban, and urban schools and serve students with very different levels of prior agricultural and technical experience (Ramsey et al., 2025). As issues of equity and access in agricultural education gain prominence (Lemley, Alley, & Clary, 2024; Lemley, Alley, & Morrison, 2024), it is crucial to understand how teachers develop and update the specialized skills needed to manage high-risk lab environments so all students can participate safely and meaningfully in woodworking. Clarifying where instructors gain their woodworking competence and safety knowledge can inform teacher education programs, shape targeted professional development, and guide local and state decisions about program support and resource allocation.

In this study, middle and high school agricultural education experiences were also examined as potential contributors to the development of woodworking machinery proficiency. Participants reported their personal involvement in high school agricultural education programs by indicating whether they participated in agricultural education coursework, whether agricultural education was unavailable at their school, or whether scheduling or personal interest prevented participation. Similar questions examined participants' involvement in middle school agricultural education programs. These variables provided important context regarding the extent to which early exposure to agricultural mechanics laboratories and woodworking experiences may relate to later technical confidence and instructional preparedness as SBAE instructors.

This study examines where Georgia high school (grades 9–12) SBAE agricultural mechanics instructors say they developed their woodworking machinery skills and safety knowledge. It (a) identified the main settings in which SBAE agriculture mechanics teachers gained woodworking competence and safety knowledge, (b) analyzed how they rate the importance of each setting for their current preparedness, (c) compared reported sources of skill development across selected personal and professional characteristics, and (d) documented SBAE agriculture mechanics teachers' views of gaps in their woodworking safety preparation and areas where they most need additional training. By mapping these patterns, the study provides Georgia-specific evidence to inform more intentional, experience-based pathways for preparing and supporting SBAE teachers who lead woodworking instruction in Georgia agricultural mechanics laboratories.

Theoretical Framework

Bandura's (1997) self-efficacy theory provides the guiding lens for this study of Georgia SBAE agricultural mechanics instructors' woodworking skills and safety practices. Self-efficacy refers to individuals' beliefs about their ability to organize and carry out actions needed to achieve desired outcomes in specific tasks and contexts (Bandura, 1997). These beliefs, rather than general confidence, shape the choices teachers make, the effort they invest, and their persistence when facing challenges. In agricultural mechanics, research has shown that teachers and preservice teachers often feel less confident in mechanics-related tasks than in other parts of the SBAE curriculum, which can relate to anxiety, avoidance of certain activities, and limited use of laboratory facilities (Blackburn et al., 2015; Burris et al., 2005; McKim & Saucier, 2011; Saucier & McKim, 2011; Tummons et al., 2017; Whitehair et al., 2020).

Recent studies emphasized that this self-efficacy develops over time through accumulated, hands-on experiences and supportive learning environments. For example, a meaningful shop experience increased female undergraduates' mechanics self-efficacy (Granberry et al., 2022), and preservice teachers reported that limited prior exposure to shop work hindered their confidence and interest (McKibben et al., 2022). Drawing on Bandura's (1997) sources of self-efficacy, the study did not directly measure all components of self-efficacy theory, such as vicarious experiences, social persuasion, or physiological and emotional states. In agricultural education research, theory should be used intentionally to clarify how variables are interpreted and how findings contribute to disciplinary knowledge; therefore, Bandura's (1997) framework was used primarily as a lens for interpreting relationships among training experiences, confidence, and instructional practices rather than as a fully operationalized theoretical model (Harder et al., 2021). Similarly, McKibben et al. (2023) reported that efficacy beliefs were associated with pedagogical approaches in skill-based agricultural mechanics instruction, further supporting the use of Bandura’s (1997) framework as an interpretive lens for instructional decision-making.

Prior work in agricultural mechanics suggested that the amount and quality of coursework and lab experience, access to well-equipped facilities, opportunities to develop technical competence, and the influence of mentors and professional development all shape perceived preservice teachers ’competence and readiness to teach agricultural mechanics (Byrd, Anderson, & Paulsen, 2015; Clark et al., 2021; Clemons et al., 2018; Faulk et al., 2024; Gorter & Swan, 2018; Granberry et al., 2023; Hainline & Wells, 2019, 2024; McCubbins et al., 2016; McCubbins et al., 2017; McKibben et al., 2022; Toft et al., 2021; Wells & Hainline, 2021; Wells et al., 2013). Croom et al. (2026) similarly identified agricultural mechanics as a continuing need for professional development among agricultural education teachers throughout the southeastern United States. Within this framework, teachers’ reports of where they “learned” woodworking and safety are interpreted as accounts of where efficacy-relevant information has accumulated, and their perceived gaps and training needs are viewed as areas of relatively low self-efficacy. Recent agricultural mechanics research likewise indicated that instructors’ perceptions of technical competence are associated with the instructional decisions they make regarding laboratory implementation and pedagogy (McKibben et al., 2023). Clemons et al. (2018) suggested that identifying teachers' needs for agricultural mechanics content provides valuable information for designing targeted professional development that addresses specific instructional deficiencies.

In line with broader conversations about theory use in agricultural education (Harder et al., 2021), this self-efficacy perspective structured the study's focus on developmental experiences, perceived contributions of each context, differences across teacher backgrounds, and the identification of priority areas for additional training in the operation and safety of woodworking machinery.

Recent agricultural education research continues to demonstrate that agricultural mechanics instruction is influenced by teachers' technical preparation, mastery experiences, professional development, perceived competence, and institutional support (Clemons et al., 2018; Croom et al., 2026; Faulk et al., 2024; McKibben et al., 2022; McKibben et al., 2023). However, little research has specifically examined how these factors relate to woodworking machinery instruction within SBAE programs, providing the rationale for this study.

Purpose and Objectives

The purpose of this study was to describe the sources through which Georgia high school (grades 9–12) SBAE agricultural mechanics instructors report developing their woodworking machinery skills and safety knowledge, and to examine how these reported sources vary across selected personal and professional characteristics. Guided conceptually by Bandura's (1997) self-efficacy theory, the study focused on developmental experiences that may relate to instructors' current sense of preparedness to operate woodworking machinery, teach its use, and manage associated safety risks.

The specific objectives of the study were to

1. Identify the primary contexts (high school instruction, FFA, collegiate coursework, professional training, and personal experience) through which Georgia SBAE agricultural mechanics instructors report developing woodworking machinery skills and safety knowledge.

2. Determine how Georgia SBAE agricultural mechanics instructors perceive these developmental contexts in contributing to their confidence in teaching and using woodworking machinery.

3. Examine differences in agricultural mechanics instructors' perceived sources of knowledge in agriculture mechanics in comparison to the instructors' personal and professional characteristics (years of teaching experience, school setting, age, gender, and program size).

4. Assess the extent to which SBAE agricultural mechanics instructors perceive their levels of woodworking safety preparation.

Methods

This study employed a nonexperimental, descriptive-correlational survey design (Lindner et al., 2001; Nunnally & Bernstein, 1994) to examine the sources through which Georgia high school SBAE agricultural mechanics instructors report developing their woodworking machinery skills and safety knowledge. The design was appropriate for (a) describing the relative contribution of multiple developmental experiences to instructors' perceived preparation and (b) exploring differences in perceived sources of skill development across selected personal and professional characteristics (McKim & Saucier, 2012; Wells & Hainline, 2021).

Participants

The target population for this study consisted of Georgia SBAE instructors who taught agricultural mechanics courses incorporating woodworking during the 2025-2026 academic year. The accessible population included all instructors identified through Georgia Agricultural Education Department records who (a) were assigned to an SBAE program and (b) were listed as teaching at least one course categorized as agricultural mechanics as of Fall 2025. Participants were further screened within the survey instrument to confirm that they had experience teaching woodworking-related content within agricultural mechanics instruction. Individuals who indicated they had not taught woodworking-related agricultural mechanics content were excluded from participation in the study.

A census sampling approach was employed in the study (Creswell & Creswell, 2018), whereby all members of the accessible population were invited to complete the electronic questionnaire. Contact information was obtained through the statewide Georgia SBAE teacher directory maintained by the Georgia Agricultural Education Department. The original directory from the Georgia Agricultural Education Department listed 145 instructors who were teaching agricultural mechanics courses during the Fall 2025 or Spring 2026 semester.

Before survey distribution, the population list was refined for the accuracy of the accessible population. Five instructors on the original list were removed because they were no longer employed in teaching positions during the Spring 2026 semester, having accepted positions outside of education. Additionally, the researcher’s name appeared within the original Georgia Agricultural Education Department directory and was removed to eliminate self-participation and potential bias within the respondent pool. Participants were also screened using the survey instrument to verify involvement in woodworking instruction, and individuals who indicated they did not teach woodworking in agricultural mechanics were excluded from the study population.

The survey instrument was administered electronically using Qualtrics. The questionnaire officially launched on March 20, 2026, and remained open through May 7, 2026. Distribution procedures included one initial invitation email sent in March, followed by reminder emails sent over the 7-week period. These repeated contacts were implemented to encourage participation and raise response rates among the accessible population.

During the initial survey distribution, 13 email messages were returned as undeliverable due to potentially invalid email addresses, district email filtering systems, spam-blocking protocols, or individual inbox settings. To address these delivery issues, the researcher created individualized Qualtrics survey links and sent them directly to affected instructors when alternative contact information was available. As a result of these follow-up procedures, eight additional survey responses were successfully collected.

A total of 106 instructors responded to the Qualtrics questionnaire during the data collection period. One individual selected the survey option indicating they did not wish to participate in the study and was removed from the respondent pool. Responses were further screened for completeness. Respondents who completed fewer than 50%

of the questionnaire were excluded from the final analysis because most omissions occurred in the participant characteristics section, resulting in substantial missing data across key study variables.

After data screening procedures were completed, a total of 91 usable responses remained for analysis, yielding a utilizable response rate of 85.8% from the accessible population. The final participant sample comprised Georgia SBAE agricultural mechanics instructors across multiple school settings, teaching assignments, and program sizes, providing a broad representation of those engaged in woodworking instruction throughout the state.

Participant Characteristics

The participant sample consisted of (N = 91) SBAE agricultural mechanics instructors from across Georgia. The majority of participants identified as male (84.6%, n = 77), while 14.3% (n = 13) identified as female. Most respondents reported teaching in rural communities (65.9%, n = 60), followed by town settings (20.9%, n = 19), and suburban settings (12.1%, n = 11). Participant age distributions were relatively balanced across categories, although the largest age groups were instructors aged 40 to 49 years (29.7%, n = 27) and 30 to 39 years (28.6%, n = 26) (see Table 2.1).

Teaching experience among participants varied considerably, with the largest proportion reporting 11-15 years of SBAE teaching experience (23.1%, n = 21), followed by 6-10 years (22.0%, n = 20). Most respondents reported teaching primarily at the high school level (89.0%, n = 81), while smaller percentages taught at the middle school level, at both the middle and high school levels, or served in Georgia state staff positions. Overall, the participant sample represented a diverse range of SBAE agricultural mechanics instructors with varying backgrounds, teaching experiences, and program contexts across Georgia (see Table 2.1).

Table 2.1. Participant characteristics (n = 91)

Variable Category	*f*	%
Gender		
Male	77	84.6
Female	13	14.3
Did Not Answer	1	1.1
Community		
Rural	60	65.9
Town	19	20.9
Suburban	11	12.1
Did Not Answer	1	1.1
Age		
40-49	27	29.7
30-39	26	28.6
20-29	17	18.7
50-59	16	17.6
60-69	3	3.3
Did Not Answer	2	2.2
Years of SBAE Teaching Experience		
11-15	21	23.1
6-10	20	22.0
0-5	14	15.4
21-25	12	13.2
16-20	11	12.1
26-30	8	8.8
31 and Greater	3	3.3
Did Not Answer	2	2.2
Current Teaching Level		
High School (9-12 Grades)	81	89
Georgia State Staff	4	4.4
Both Middle and High School (6-12 Grades)	3	3.3
Middle School (6-8 Grades)	2	2.2
Did Not Answer	1	1.1

Nonresponse error was addressed by comparing early and late respondents on key variables (Lindner et al., 2001). Respondents were categorized as early (1st 25 days) or late (2nd 25 days) based on the timing of their survey responses. In the questionnaire time frame, the independent samples *t*-tests revealed no statistically significant differences between early and late respondents on key study variables, including woodworking knowledge, confidence in using woodworking equipment, sufficient training, and personal knowledge of the equipment ($p > .05$). These findings suggested that respondents were reasonably representative of the accessible population.

In this data analysis, respondents' woodworking knowledge, early participants' (*n* = 45) scores (*M* = 3.57, SD = 0.72) were slightly higher than the late participants' (*n* = 46) scores (*M* = 3.32, SD = 0.74). Similarly, confidence in using woodworking equipment scores among early participants (*n* = 45) (*M* = 4.43, SD = 0.65) was marginally higher than the late participants (*n* = 44) scores (*M* = 4.26, SD = 0.80). Also, the scores of early participants (*n* = 45) (*M* = 4.49, SD = 0.63) were slightly higher than those of late participants (*n* = 46) (*M* = 4.43, SD = 0.69). Finally, personal knowledge of the equipment scores among early participants (*n* = 45) (*M* = 2.53, SD = 0.55) was marginally higher than the late participants' (*n* = 46) scores (*M* = 2.28, SD = 0.54) (see Table 2.2).

Table 2.2. Nonresponse error, early versus late group statistics (n = 91)

Variable Category	*N*	*M*	*SD*	Std. Error *M*
Knowledge Composite				
Early	45	3.57	0.72	0.11
Late	46	3.32	0.74	0.11
Confidence Using Composite				
Early	45	4.43	0.65	0.10
Late	44	4.26	0.80	0.12
I have Received Enough Training				
Early	45	4.49	0.63	0.09
Late	46	4.43	0.69	0.10
Personal Knowledge of Equipment				
Early	45	2.53	0.55	0.08

Variable Category	*N*	*M*	*SD*	Std. Error *M*
Late	46	2.28	0.54	0.08

A Levene's test for equality of variances was conducted, which indicated that the assumption of homogeneity of variance was met for all variables ($p > .05$), except personal knowledge of equipment ($p < .03$). Independent sample *t*-tests were conducted to compare early and late respondents on woodworking knowledge, confidence in using woodworking equipment, sufficient training, and personal knowledge of the equipment. Results indicated that there was no statistically significant difference between early and late respondents for woodworking knowledge ($t(89) = 1.64$, $p = 0.11$), confidence in using woodworking equipment ($t(87) = 1.08$, $p = 0.28$), and sufficient training ($t(89) = 0.39$, $p = 0.70$). However, a statistically significant difference was identified for personal knowledge of woodworking equipment ($t(89) = 2.19$, $p = 0.03$) (see Table 2.3). The analysis also indicates a small-to-moderate effect size ($d = 0.08$-0.46), suggesting only limited practical differences between the groups. Although the personal knowledge of woodworking equipment variables showed a statistically significant difference, the overall findings suggested that nonresponse bias was unlikely to be a substantial threat to the interpretation of the study findings. This interpretation is consistent with recommendations for evaluating nonresponse error in agricultural education survey research (Lindner, 2002).

Table 2.3. Nonresponse error, early versus late variables (n = 91)

Variable Category	Levene's Test Sig.	*t*	*Df*	Two-Sided p
Knowledge Composite	0.99	1.64	89	0.11
Confidence Using Composite	0.08	1.08	87	0.28
I have Received Enough Training	0.73	0.39	89	0.70
Personal Knowledge of Equipment	0.28	2.19	89	0.03

Instrumentation and Data Analysis

Data were collected using a researcher-developed electronic questionnaire administered via Qualtrics and emailed to the identified population. The instrument was designed to examine (a) the experiential context through which SBAE instructors developed woodworking machinery skills and safety knowledge, (b) instructors' perceived confidence in using and teaching stationary woodworking equipment, (c) perceptions of safety preparation and professional development related to woodworking machinery, and (d) selected personal and professional characteristics. Instrument items were developed by reviewing prior literature on agricultural mechanics preparation, laboratory management, agricultural mechanics teacher development, and professional development needs (Burris et al., 2005; Clark et al., 2021; Hainline & Wells, 2019, 2024; McKim & Saucier, 2011; Wells & Hainline, 2021), as well as by Bandura's (1997) conceptualization of self-efficacy and experiential learning sources. The questionnaire consisted primarily of researcher-developed Likert-type, categorical, checklist, and matrix-style items aligned with the study objectives.

The questionnaire consisted of four major sections relevant to this study: (a) sources of woodworking machinery skill and safety knowledge, (b) confidence in woodworking machinery use and instruction, (c) perceptions of woodworking implementation and barriers, and (d) personal and professional characteristics.

Sources of Woodworking Machinery Skill and Safety Knowledge

Participants were asked to identify the context through which they developed woodworking machinery skills and safety knowledge. These items included prior participation in middle school and high school agricultural education, collegiate coursework, student teaching, professional learning opportunities (PLUs), work outside of teaching, family or hobby, and other formal and informal training experiences. Respondents also identified whether they had received safety training on specific stationary woodworking machines, including table saws, jointers, planers, routers, computer numerical control (CNC) routers, band saws, and other related equipment.

Confidence in Woodworking Machinery Use and Instruction

Respondents rated their confidence in personally using stationary woodworking machinery and their confidence in teaching students to safely use the equipment. Confidence ratings were collected for multiple woodworking machines, including a variety of sanders, drill press, jointer, planer, router or shaper, CNC router, band saw, miter saw, panel saw, radial arm saw, and table saw. Participants rated their confidence in using stationary woodworking equipment on a 5-point Likert-type scale, ranging from not confident (scale category 1) to confident (scale category 5). Central tendencies for scale items were interpreted using Lindner and Lindner's (2024) suggestions for interpreting 5-point summated scales. Ancillary questions assessed participants' perceptions of having received sufficient safety training to supervise students safely using stationary woodworking equipment, as well as the frequency of their participation in professional learning opportunities related to woodworking machinery.

Perceptions of Woodworking Implementation and Barriers

Participants responded to a series of items related to perceptions of agricultural mechanics and woodworking instruction within SBAE programs. These items included perceptions of program support, equipment availability, instructional space, consumable resources, community support, and the instructor's role within agricultural education pathways. Additional semantic differential-style items measured respondents' perceptions regarding the difficulty, danger, liability, and school support associated with teaching woodworking in agricultural mechanics programs.

Personal and Professional Characteristics

The final section collected personal and professional background information, including teaching level, previous teaching experiences, gender, age, years of teaching experience, certification pathway, educational attainment, school setting, agricultural mechanics course offerings, and approximate program size. Participants also reported prior involvement in agricultural education and youth organizations such as FFA, 4-H, and scouting programs. These variables were included based on prior research examining relationships between teacher characteristics, agricultural mechanics preparation, professional development, and instructional confidence (Hainline & Wells, 2024; McKim & Saucier, 2013; Rasty et al., 2017; Trickett et al., 2023).

Validity and Reliability

The researcher-developed instrument was designed to examine SBAE agricultural mechanics instructors' perceptions regarding the development of knowledge of woodworking machinery and safety preparation, confidence in using and teaching woodworking equipment, and selected personal and professional characteristics. To ensure the instrument's quality and consistency, procedures were implemented to address both validity and reliability.

Validity

Content and face validity of the instrument were established through an extensive review of the literature related to agricultural mechanics education, laboratory safety, woodworking instruction, teacher preparation, and professional development within SBAE. Instrument items were informed by prior agricultural mechanics and laboratory safety research (Burris et al., 2005; Clark et al., 2021; Hainline & Wells, 2019, 2024; McKim & Saucier, 2011; Wells & Hainline, 2021), as well as Bandura's (1997) theory of self-efficacy and experiential learning sources. The instrument was structured to align directly with the study's research objectives and included items related to (a) woodworking machinery knowledge, (b) safety training experiences, (c) confidence in using and teaching woodworking equipment, (d) professional learning participation, (e) perceptions of woodworking implementation and barriers, and (f) personal and professional characteristics.

To further establish face and content validity, the instrument was reviewed by individuals with expertise in agricultural mechanics education, SBAE instruction, agricultural education research, and laboratory safety. Feedback from reviewers was used to refine item wording, improve clarity, strengthen alignment with the research objectives, and reduce ambiguity within the questionnaire items. The expert review process provided evidence that the instrument adequately represented the content domains relevant to the study and appeared appropriate for measuring the intended topics.

Although face and content validity were supported through literature review and expert evaluation, no formal construct validation procedures were conducted. Specifically, exploratory factor analysis, confirmatory factor analysis, or other psychometric techniques used to establish construct mathematical validity were not performed. Therefore, the composite variables used in this study should be interpreted as operationalized measures developed to address the research objectives rather than as fully validated constructs.

Reliability

Internal consistency reliability of the instrument was assessed using Cronbach's alpha coefficient. Reliability analysis was conducted in SPSS for 94 instrument items associated with woodworking machinery knowledge, confidence, safety preparation, perceptions of implementation, and professional development experiences.

Consistent with current recommendations for reporting instrumentation-based reliability coefficients, Cronbach's alpha was used to evaluate the internal consistency of the scaled questionnaire items (Clemons & Lindner, 2025). The instrument demonstrated a high level of internal consistency reliability, with a Cronbach's alpha coefficient of (α = .944, N = 94). According to commonly accepted reliability standards (George & Mallery, 2020), an alpha coefficient above .90 indicates excellent internal consistency among instrument items. The resulting alpha value suggested that the instrument items consistently measured constructs related to woodworking machinery knowledge, confidence, safety preparedness, and agricultural mechanics experience among SBAE instructors.

A high reliability coefficient indicated that the instrument was appropriate for examining relationships among woodworking knowledge development, confidence in using woodworking machinery and receiving instruction, safety preparation, and personal and professional instructor characteristics. Additionally, the high internal consistency supported the use of composite variables and scale scores for subsequent statistical analyses conducted within the study.

Interpretation of Reliability Findings

Although the instrument demonstrated excellent reliability, the questionnaire comprised multiple item types, including Likert-type scales, matrix items, categorical response items, and checklist-style questions. Therefore, Cronbach's alpha was interpreted primarily as evidence of overall internal consistency among the scaled items in the reliability analysis, rather than as evidence that all instrument sections measured a single construct. The reliability findings nonetheless supported the instrument's stability and consistency for use within the present study.

Findings

Research Question 1: What are the primary contexts (high school instruction, FFA, collegiate coursework, professional training, and personal experience) through which Georgia agricultural mechanics instructors report developing woodworking machinery skills and knowledge?

The research sought to identify the primary contexts (high school instruction, FFA, collegiate coursework, professional training, and personal experience) through which Georgia SBAE agricultural mechanics instructors reported developing woodworking machinery skills, technical knowledge, and safety preparation. The questionnaire focused on instrument items assessing knowledge of woodworking equipment, machinery-specific training experiences, agricultural mechanics content knowledge, collegiate preparation, and prior involvement in middle and high school agricultural education programs.

The respondents reported they received safety training on stationary woodworking equipment with tables saw and miter saw the highest reported training (*M* = 2.75, *SD* = 0.44), band saw (*M* = 2.65, *SD* = 0.48), drill press and radial arm saw (*M*

= 2.61, *SD* = 0.49), jointer and sanders (*M* = 2.44, *SD* = 0.50), planer (*M* = 2.55, *SD* = 0.50), router or shaper and scroll saw (*M* = 2.43, *SD* = 0.52), panel saw (*M* = 2.31, *SD* = 0.49), and CNC router with the lowest reported training (*M* = 2.21, *SD* = 0.44) (see Table 2.4). The respondents reported receiving more training on the table saw than on the CNC router.

Table 2.4. Skill development and knowledge: Instructor received safety training on stationary woodworking equipment (n = 91)

Variable Category	*M*	*SD*
Table Saw	2.75	0.44
Miter Saw	2.75	0.44
Band Saw	2.65	0.48
Radial Arm Saw	2.61	0.49
Drill Press	2.60	0.49
Sander (belt, disc, or combination)	2.56	0.50
Planer	2.55	0.50
Jointer	2.44	0.50
Router or Shaper	2.43	0.52
Scroll Saw	2.43	0.52
Panel Saw	2.31	0.49
CNC Router	2.21	0.44

The participants' responses provided an overall measure of perceived familiarity and competence with woodworking machinery commonly used in agricultural mechanics laboratories. Participants rated their knowledge of stationary woodworking equipment from none (scale category 0) to high (scale category 3). The mean knowledge for the stationary woodworking equipment category was *M* = 2.41, *SD* = 0.56, indicating that the average respondent's knowledge was adequate. The respondents reported their knowledge of stationary woodworking equipment as low (2.3%, *f* = 3), adequate (52.7%, *f* = 48), or high (44.0%, *f* = 40) (see Table 2.5). This indicates that more than half of the respondents reported having adequate knowledge about stationary woodworking equipment.

Table 2.5. Skill development and knowledge: Knowledge of woodworking equipment (n = 91)

Variable Category	*f*	%
Adequate	48	52.7
High	40	44.0
Low	3	2.3

Respondents reported varying levels of knowledge across agricultural mechanics content areas. The participants' combined self-reported knowledge level in agricultural mechanics was M = 3.45, SD = 0.73. Respondents indicated a high level of knowledge in general mechanics safety (31.9%, f = 29), whereas hydraulics (4.4%, f = 4) had the lowest reported level of knowledge.

The mode knowledge level in the agricultural mechanics categories is general mechanics safety, tool use, tool maintenance, woodworking, electricity (AC), welding, and agricultural machinery categories was *Mode* = 4, corresponding to the above-average range. Whereas the mode knowledge level in the agricultural mechanics categories was wood construction, plumbing, concrete/masonry, surveying, electricity (DC), and small engines; the hydraulics category was *Mode* = 3, corresponding to the average range (Lindner & Lindner, 2024).

The respondents reported their highest level of knowledge in agricultural mechanics is ranked as above average: general mechanics safety (M = 4.12, SD = 0.71), general tool use (M = 4.00, SD = 0.73), tool maintenance (M = 3.67, SD = 0.93), woodworking (M = 3.79, SD = 0.81), alternating current (AC) electricity (M = 3.69, SD = 0.93), welding and hot metal work (M = 3.77, SD = 0.91), and agricultural machinery (M

= 3.57, *SD* = 1.01). However, respondents reported an average level of knowledge in agricultural mechanics in small engines and internal combustion power (*M* = 3.41, *SD* = 1.02), plumbing (*M* = 3.19, *SD* = 0.93), direct current (DC) electricity (*M* = 3.32, *SD* = 1.00), wood construction and framing (*M* = 3.42, *SD* = 1.04), concrete and masonry (*M* = 2.73, *SD* = 0.99), hydraulics (*M* = 2.71, *SD* = 1.01), and surveying (*M* = 2.87, *SD* = 1.14) (see Table 2.6). The respondents reported that their knowledge of agricultural mechanics was higher in general mechanics safety than in hydraulics.

Table 2.6. Skill development and knowledge: Knowledge level in agricultural mechanics (n = 91)

Variable Category	*M*	*SD*
General Mechanics Safety	4.12	0.71
Tool Use (General)	4.00	0.73
Woodworking	3.79	0.81
Welding / Hot Metal Work	3.77	0.91
Electricity (AC)	3.69	0.93
Tool Maintenance	3.67	0.93
Agricultural Machinery	3.57	1.01
Wood Construction / Framing	3.42	1.04
Small Engines / Internal Combustion Power	3.41	1.02
Electricity (DC)	3.32	1.00
Plumbing	3.19	0.93
Surveying	2.87	1.14
Concrete / Masonry	2.73	0.99
Hydraulics	2.71	1.01

To further examine developmental pathways, instructors were asked to identify where they believed they had acquired most of their knowledge in woodworking and agricultural mechanics. The respondents selected from multiple experiential contexts where their knowledge in agricultural mechanics was gained: by self-directed learning (60.4%, *f* = 55), experiences gained while teaching (53.8%, *f* = 49), high school agricultural education programs (50.5%, *f* = 46), family or friend mentorship (49.5%, *f* =

45), occupations outside of teaching (48.4%, *f* = 44), college coursework (44.0%, *f* = 40), teacher workshops (34.1%, *f* = 31), and junior college or technical school instruction (8.8%, *f* = 8). Three participants responded, "other" (3.3%, *f* = 3) (see Table 2.7). The respondents reported that the majority of their knowledge of stationary woodworking equipment was acquired through self-directed learning.

Table 2.7. Skill development and knowledge: Where knowledge was gained (n = 91)

Variable Category	*f*	%
Self taught	55	60.4
On the job as a teacher	49	53.8
High School	46	50.5
Working with family or friends	45	49.5
On the job, working outside of teaching	44	48.4
College	40	44.0
Through workshops for teachers	31	34.1
Jr / Community / Trade / 2yr School	8	8.8
Other	3	3.3

Respondents identified their participation in middle and high school agriculture classes, from "agriculture classes not offered at my school" (scale category 1) to "I was in agriculture classes" (scale category 4). The mean of the participants' middle school involvement category was M = 2.07 (SD = 1.43), indicating that the average respondent's middle school involvement in agriculture classes was "agriculture did not fit into my schedule." The *Mode* = 1 was reported as "agriculture was not offered at my high school." Skewness for the school setting variable was 0.62, indicating a moderately positive skewness toward "agriculture classes not being offered."

The participants' high school involvement (M = 3.62, SD = 0.91) indicated that the respondents were enrolled in agriculture classes. The mode of respondents' high school agriculture class involvement was *Mode* = 4, indicating they were in an agriculture class at their high school. The majority of respondents reported they were involved in high school agriculture classes in high school (81.3%, *f* = 74). However, the majority also reported “agriculture was not offered at my middle school” (61.5%, *f* = 56) (see Table 2.8).

Table 2.8. Skill development and knowledge: Middle and high school agriculture class involvement (n = 91)

Variable Category	*f*	%
Middle School		
Ag was not offered	56	61.5
I was in Ag	31	34.1
Ag did not fit into my schedule	2	2.2
Did Not Answer	2	2.2
High School		
I was in Ag	74	81.3
Ag was not offered	7	7.7
Ag did not fit into my schedule	5	5.5
Not in Ag, I didn’t want to be	3	3.3
Did Not Answer	2	2.2

Participants provided insight into the extent to which teacher preparation programs related directly to SBAE instructors' knowledge of woodworking machinery and machine-specific instructional preparation. The respondents reported receiving safety training as part of their collegiate training courses for the following woodworking equipment as follows: tables saw with the highest reported training (*M* = 2.37, *SD* = 0.49), followed by band saw and miter saw (*M* = 2.36, *SD* = 0.48), drill press (*M* = 2.33, *SD* = 0.47), radial arm saw (*M* = 2.31, *SD* = 0.46), sanders (*M* = 2.30, *SD* = 0.46), planer (*M* = 2.26, *SD* = 0.44), jointer and router or shaper (*M* = 2.21, *SD* = 0.41), scroll saw (*M* = 2.17, *SD* = 0.38), panel saw (*M* = 2.12, *SD* = 0.36), and CNC router with the lowest reported training (*M* = 2.11, *SD* = 0.32) (See Table 2.9). This indicated that the instructors received more training on stationary woodworking equipment in the collegiate system, particularly on the table saw, and less training on CNC routers.

Table 2.9. Skill development and knowledge: In the collegiate system the instructor received safety training on stationary woodworking equipment (n = 91)

Variable Category	*M*	*SD*	*F*	%
Table Saw	2.37	0.49	34	37.4
Band Saw	2.36	0.48	33	36.3
Miter Saw	2.36	0.48	33	36.3
Drill Press	2.33	0.47	30	33.0
Radial Arm Saw	2.31	0.46	28	30.8
Sander (belt, disc, or combination)	2.30	0.46	27	29.7
Planer	2.26	0.44	23	25.3
Jointer	2.21	0.41	19	20.9
Router or Shaper	2.21	0.41	19	20.9
Scroll Saw	2.17	0.38	15	16.5
Panel Saw	2.12	0.36	12	13.2
CNC Router	2.11	0.32	10	11.0

Research Question 2: How do SBAE agricultural mechanics instructors perceive these developmental contexts in contributing to their confidence in teaching and using woodworking machinery?

Participants began by identifying the nature of their student teaching experiences. The instructors then reported whether their student teaching placement occurred within agricultural education, outside agricultural education, or whether they did not participate in student teaching experiences. These items provided insight into the extent to which authentic SBAE classroom and laboratory immersion experiences may have related to the instructors' later instructional confidence in the operation and supervision of woodworking machinery.

The respondents reported their "student teaching experience was in agricultural education" (81.3%, $f = 74$), the participants' "student teaching experience was something other than agricultural education” (6.6%, *f* = 6), or the respondent “did not student teach” (12.1%, *f* = 11) (see Table 2.10). This indicates that the majority of the respondents reported that their student teaching experience was in agricultural education.

Table 2.10. Confidence in teaching: Student teaching experience (n = 91)

Variable Category	*F*	%
My student teaching was in Ag Education	74	81.3
I did not student teach	11	12.1
My student teaching was something other than Ag Education	6	6.6

Examining completed educational experiences provides important context for understanding potential developmental pathways associated with confidence in stationary woodworking equipment. The respondents reported their completed agricultural education degree from an undergraduate program (75.8%, *f* = 69), master's (54.9%, *f* = 50), specialist (31.9%, *f* = 29), junior college (17.6%, *f* = 16), and doctorate (7.7%, *f* = 7) (see Table 2.11). The respondents reported that more than half of the participants had earned undergraduate and master’s degrees in agricultural education.

Table 2.11. Confidence in teaching: Level of completed education as an agriculture education major (n = 91)

Variable Category	*f*	%
Undergraduate Major		
Ag Ed	69	75.8
Other	17	18.7
Did Not Answer	5	5.5
Masters Major		
Ag Ed	50	54.9
Other	17	18.7
Did Not Answer	24	26.4
Specialist Major		
Ag Ed	29	31.9
Other	14	15.4
Did Not Answer	48	52.7

Variable Category	*f*	%
Jr College Major		
Ag Ed	16	17.6
Other	17	18.7
Did Not Answer	58	63.7
Doctoral Major		
Ag Ed	7	7.7
Other	5	5.5
Did Not Answer	79	86.8

The mode confidence using a sander, drill press, jointer, planer, router or shaper, band saw, miter saw, panel saw, radial arm saw, scroll saw, and table saw categories was *Mode* = 5, corresponding to the confidence range. Whereas the mode confidence using a CNC category was *Mode* = 3, corresponding to the neither confident nor not confident range (Lindner & Lindner, 2024).

The respondents reported their highest level of confidence in using stationary woodworking equipment average with all of the following woodworking machines ranked as confident: sanders with the highest reported confidence (*M* = 4.86, *SD* = 0.38), followed by miter saw (*M* = 4.85, *SD* = 0.39), drill press (*M* = 4.74, *SD* = 0.71), tables saw (*M* = 4.66, *SD* = 0.82), band saw (*M* = 4.64, *SD* = 0.82), radial arm saw (*M* = 4.48, *SD* = 1.02), planer (*M* = 4.34, *SD* = 1.08), scroll saw (*M* = 4.17, *SD* = 1.22), router or shaper (*M* = 4.24, *SD* = 1.08), jointer (*M* = 3.99, *SD* = 1.28), and panel saw (*M* = 4.03, *SD* = 1.28). However, respondents reported their highest level of confidence in the CNC router as neither confident nor not confident (33.0%, *f = 30),* which was the lowest reported confidence level among all woodworking equipment (see Table 2.12). The respondents reported that their confidence in personally using sanders was higher than in using a panel saw.

Table 2.12. Confidence in teaching: Level of confidence in USING tools personally (n = 91)

Variable Category	*M*	*SD*
Sander (belt, disc, or combination)	4.86	0.38
Miter Saw	4.85	0.39
Drill Press	4.74	0.71
Table Saw	4.66	0.82
Band Saw	4.64	0.82
Radial Arm Saw	4.48	1.02
Planer	4.34	1.08
Router or Shaper	4.24	1.08
Scroll Saw	4.17	1.22
Panel Saw	4.03	1.28
Jointer	3.99	1.28
CNC Router	3.29	1.35

The mode confidence level in teaching a sander, drill press, band saw, miter saw, and table saw categories was *Mode* = 5, corresponding to the confidence range. The jointer, planer, router or shaper, panel saw, radial arm saw, and scroll saw categories were in the *Mode* = 4 category, corresponding to the somewhat confident range. Whereas the mode confidence using a CNC router category was *Mode* = 3, corresponding to the neither confident nor not confident range (Lindner & Lindner, 2024).

The respondents reported their highest level of confidence in using stationary woodworking equipment average with all of the following woodworking machines ranked as confident: miter saw with the highest reported confidence (*M* = 4.80, *SD* = 0.50), sander (*M* = 4.77, *SD* = 0.47), drill press (*M* = 4.58, *SD* = 0.84), tables saw (*M* = 4.62, *SD* = 0.83), band saw (*M* = 4.51, *SD* = 0.96), radial arm saw (*M* = 4.31, *SD* = 1.14), planer (*M* = 4.26, *SD* = 1.19), scroll saw (*M* = 4.14, *SD* = 1.23), router or shaper (*M* = 4.19, *SD* = 1.06), jointer (*M* = 3.86, *SD* = 1.37), and panel saw (*M* = 3.98, *SD* = 1.32).

However, respondents reported their highest level of confidence in the CNC router as neither confident nor not confident (22.0%, *f = 20),* which was the lowest reported confidence level among all woodworking equipment (see Table 2.13). The respondents reported that their confidence in teaching students about miter saws was higher than in using a panel saw.

Table 2.13. Confidence in teaching: Level of confidence in TEACHING tools (n = 91)

Variable Category	*M*	*SD*
Miter Saw	4.80	0.50
Sander (belt, disc, or combination)	4.77	0.47
Table Saw	4.62	0.83
Drill Press	4.58	0.84
Band Saw	4.51	0.96
Radial Arm Saw	4.31	1.14
Planer	4.26	1.19
Router or Shaper	4.19	1.06
Scroll Saw	4.14	1.23
Panel Saw	3.98	1.32
Jointer	3.86	1.37
CNC Router	3.22	1.37

To investigate whether there is a statistically significant association between SBAE agricultural mechanics instructors' confidence in personally using stationary woodworking equipment and their confidence in teaching with stationary woodworking equipment, a correlation analysis was conducted. The assumptions of the test were not met, indicating that the confidence in teaching composite was negatively skewed (-1.62). This violated the assumption of normality. Additionally, inspection of the scatterplot suggested that the relationship between the variables was not perfectly linear. Therefore, Spearman's rank-order correlation was used as the primary measure of association.

The Spearman's Rho analysis revealed a statistically significant, strong positive relationship between instructors' confidence in personally using stationary woodworking equipment and their confidence in teaching with stationary woodworking equipment, $r_s(86) = .884$, $p < .001$. Spearman's rank-order correlation was used as the primary measure of association because the assumption of normality was violated and the relationship between variables was not perfectly linear. Effect size interpretations were based on Cohen's (1988) guidelines. This finding indicated that instructors who reported greater confidence in operating stationary woodworking equipment also tended to report greater confidence in teaching students to use the equipment safely and effectively. These findings provide strong evidence that personal confidence in operating woodworking equipment is closely associated with confidence in teaching students to use the equipment in agricultural mechanics.

Professional development participation was also examined by tracking instructors' attendance in Professional Learning Unit (PLU) workshops involving stationary woodworking equipment. Among respondents who reported they had never attended a professional learning unit (PLU) or class involving use or safety training on stationary woodworking equipment, the least reported training was with the panel saw (M = 0.13, SD = 0.55), CNC router (M = 0.19, SD = 0.58), jointer (M = 0.20, SD = 0.60), scroll saw (M = 0.21, SD = 0.63), radial arm saw (M = 0.24, SD = 0.68), sanders (M = 0.28, SD = 0.77), drill press (M = 0.27, SD = 0.73), planer and router or shaper (M = 0.26, SD = 0.65), band saw (M = 0.26, SD = 0.65), miter saw (M = 0.29, SD = 0.69), and tables saw with the highest reported training (M = 0.37, SD = 0.79) (see Table 2.14).

The majority of respondents reported never attending a PLU class involving the use or safety training for the 12 identified pieces of stationary woodworking equipment.

Table 2.14. Skill development and knowledge: Instructor received safety training on stationary woodworking equipment (n = 91)

Variable Category	*M*	*SD*	*F*	%
Table Saw	0.37	0.79		
0 PLU Class			67	73.6
1 or more PLUs			22	24.2
Did Not Answer			2	2.2
Miter Saw	0.29	0.69		
0 PLU Class			73	80.2
1 or more PLUs			17	18.7
Did Not Answer			1	1.1
Sander (belt, disc, or combination)	0.28	0.77		
0 PLU Class			76	83.5
1 or more PLUs			14	15.4
Did Not Answer			1	1.1
Drill Press	0.27	0.73		
0 PLU Class			75	82.4
1 or more PLUs			15	16.5
Did Not Answer			1	1.1
Planer	0.26	0.65		
0 PLU Class			74	81.3
1 or more PLUs			16	17.6
Did Not Answer			1	1.1
Router or Shaper	0.26	0.65		
0 PLU Class			74	81.3
1 or more PLUs			16	17.6
Did Not Answer			1	1.1
Band Saw	0.26	0.65		
0 PLU Class			74	81.3
1 or more PLUs			16	17.6
Did Not Answer			1	1.1
Radial Arm Saw	0.24	0.68		
0 PLU Class			76	83.5
1 or more PLUs			14	15.4
Did Not Answer			1	1.1
Scroll Saw	0.21	0.63		
0 PLU Class			78	85.7
1 or more PLUs			12	13.2
Did Not Answer			1	1.1

Variable Category	*M*	*SD*	*F*	%
Jointer	0.20	0.60		
0 PLU Class			78	85.7
1 or more PLUs			12	13.2
Did Not Answer			1	1.1
CNC Router	0.19	0.58		
0 PLU Class			79	86.8
1 or more PLUs			12	13.2
Did Not Answer			0	0.0
Panel Saw	0.13	0.55		
0 PLU Class			83	91.2
1 or more PLUs			7	7.7
Did Not Answer			1	1.1

Research Question 3: How do SBAE agricultural mechanics instructors define their sources of knowledge in agricultural mechanics compared with instructors' personal and professional characteristics (e.g., years of teaching experience, school setting, age, gender, and program size)?

The gender distribution of SBAE agricultural mechanics instructors participating in the study indicated that most respondents were male (84.6%, *f* = 77). The remainder of the respondents identified as female (14.3%, *f* = 13), and one participant elected not to respond (1.1%, *f* = 1) (see Table 2.1), consistent with prior research on the male-dominated nature of agricultural mechanics education and technical agricultural instruction (Burris et al., 2005; Byrd et al., 2015; Granberry et al., 2023; Hainline & Wells, 2024; McKim & Saucier, 2011; Wells et al., 2013).

The respondents' age distribution of SBAE agricultural mechanics instructors participating in the study ranged from 20-29 years (scale category 1) to 60-69 years (scale category 5). The mean age (*M* = 2.65, *SD* = 1.20) and the mode age (*Mode* = 3) correspond to the 40-49 year age range (see Table 2.1). The respondents' age brackets were 40-49 (29.7%, *f* = 27), 30-39 (28.6%, *f* = 26), 20-29 (18.7%, *f* = 17), 50-59 (17.6%, *f* = 16), and 60-69 years old (3.3%, *f* = 3) (see Table 2.1). The majority of the respondents were between 30 and 49 years old, which is consistent with previous studies reporting that the agricultural education teaching workforce is largely composed of midcareer educators (Hainline & Wells, 2024; Trickett et al., 2023).

The respondents' years of SBAE teaching experience ranged from 0-5 years (scale category 1) to "31 and greater" (scale category 7). The mean teacher experience (*M* = 3.26, *SD* = 1.68) and *Mode* = 3 indicated that the average respondent had 11-15 years of experience. The respondents' SBAE years of teaching experience ranged from 0 to more than 31 years. The largest proportion of respondents reported 11-15 years (23.1%, *f* = 21), followed by 6-10 years (22.0%, *f* = 20), and the smallest group of instructors was the 31years and over participants (3.3%, *f* = 3) (see Table 2.1). Overall, the majority of respondents reported between six and 15 years of SBAE teaching experience, suggesting that the participant group was primarily composed of established, midcareer agricultural educators (Hainline & Wells, 2024; McKim & Saucier, 2013).

The respondents' mode school setting was *Mode* = 1, indicating that the average respondent's school setting corresponded to a rural school setting. The SBAE agricultural mechanics instructors reported their school environments as rural (65.9%, *f* = 60), town (20.9%, *f* = 19), and suburban (12.1%, *f* = 11) (see Table 2.1). These findings indicated that the majority of respondents were employed in rural school settings, which is consistent with the historical presence and concentration of agricultural education programs in rural communities (Ramsey et al., 2025). The respondents represented Georgia SBAE programs; the majority reported teaching primarily at the high school level (grades 9–12) (89.0%, *f* = 81). Smaller proportions indicated teaching at the middle school level (grades 6–8) (2.2%, *f* = 2), serving both middle and high school students (3.3%, *f* = 3), or holding state-level agricultural education positions (4.4%, *f* = 4). Participants also reported previous teaching experience in agricultural education at the high school level (57.1%, *f* = 52), and instructors reported experience both with middle and high school agricultural education programs (38.5%, *f* = 35) (see Table 2.15). Participants' paths to initial certification indicated that most respondents entered the profession through a traditional undergraduate student-teaching experience (76.9%, *f* = 70), which aligns with historical SBAE conventional teacher-preparation routes in agricultural education (Burris et al., 2005; Trickett et al., 2023).

Table 2.15. Participant characteristics: Current teaching level, grade level, and path to initial certification (n = 91)

Variable Category	*f*	%
Current Teaching Level		
High School (9-12 Grades)	81	89
Georgia State Staff	4	4.4
Both Middle and High School (6-12 Grades)	3	3.3
Middle School (6-8 Grades)	2	2.2
Did Not Answer	1	1.1
Grade Levels of Agriculture Education Taught		
High School (9-12 grades)	52	57.1
Both Middle (6-8 grades) and High School (9-12 grades)	35	38.5
Other	3	3.3
Path to Initial Certification		
Student Taught as an Undergraduate	70	76.9
Did not Student Teach	10	11.0
Student Taught as a Graduate	7	7.7
Student Taught as a Certification Program Non-Degree	3	3.3
Did Not Answer	1	1.1

The respondents reported the number of students in the agricultural mechanics program from none (scale category 1) to over 100 (scale category 6). The mean number of students in the agricultural mechanics program category was (M = 3.91, SD = 1.27), indicating that the average number of students in agricultural mechanics classes was reported to be 51-75.

The respondents reported their average number of students in their agricultural mechanics program: 51-75 students (26.4%, f = 24), 76-100 students (23.1%, f = 21), 26-50 students (22.0%, f = 20), 1-25 students (14.2%, f = 13), and greater than 100 students (11.0%, f = 10) (see Table 2.16). The majority of respondents were responsible for managing agricultural mechanics programs with substantial student participation, a factor that may be associated with instructors' decisions regarding the use of woodworking equipment, safety considerations, and perceived instructional effectiveness (Byrd et al., 2015; McCubbins et al., 2016; McKim & Saucier, 2013).

Table 2.16. Participant characteristics: Students in Ag Mech Program average (n = 89)

Students in the Ag Mech Program Average	*F*	%
51-75	24	26.4
76-100	21	23.1
26-50	20	22.0
1-25	13	14.3
>100	10	11.0
Did Not Answer	2	2.2
None	1	1.1

Research Question 4: To what extent do SBAE agricultural mechanics instructors perceive their levels of woodworking safety preparation?

Participants were asked to identify the educational setting or organizational level through which they had received safety training on stationary woodworking equipment.

Because respondents could select multiple options, these data provided insight into the diversity of experiences contributing to woodworking safety preparation among SBAE instructors.

Respondents to the questionnaire indicated their participation with safety training for stationary woodworking equipment: (a) in high school as part of an agriculture class, also the highest average response (48.4%, *f* = 44); (b) in college as part of a course (45.1%, *f* = 41); (c) from an adult in my life, not related to an organization (parent/grandparent/neighbor) (35.2%, *f* = 32); (d) at a teacher workshop (29.7%, *f* = 27); (e) as part of work/employment not related to teaching (27.5%, *f* = 25); (f) as part of student teaching /field experiences related to teaching (22.0%, *f* = 20); (g) I have never received any training on safety specifically for stationary woodworking equipment (18.7%, *f* = 17); (h) in high school as part of a non-Ag class (15.4%, *f* = 14); (i) in middle school as part of a course (11.0%, *f* = 10); (j) as part of a hobby course or class I did outside of a formal education (8.8%, *f* = 8); (k) as part of a formal organization outside of school (like Scouts, BB/BS, 4-H, YMCA, etc.); and (l) which was the lowest average response (1.1%, *f* = 1) (see Table 2.17). These findings suggested that formal educational experiences, particularly high school agricultural education programs and collegiate coursework, were the primary contexts in which respondents received stationary woodworking safety training.

Table 2.17. Woodworking safety preparation: Teacher participation with safety training for stationary woodworking equipment (n = 91)

Variable Category	*f*	%
In high school, as part of an Ag class	44	48.4
In college, as part of a course	41	45.1
From an adult in the teacher’s life (parent, grandparent, etc.)	32	35.2

Variable Category	*f*	%
At a teacher workshop	27	29.7
As part of work/employment not related to teaching	25	27.5
As part of student teaching experiences related to teaching	20	22.0
Never received training on safety	17	18.7
In high school, as part of a non-Ag class	14	15.4
In middle school, as part of a course	10	11.0
As part of a hobby course or class	8	8.8
As part of a formal organization outside of school	1	1.1

The respondents' "instructor average age when receiving the last safety training" for stationary woodworking equipment was reported as the respondents highest reported average as >22 years old (adult age) (33.0%, *f* = 30) and 19-22 years old (college age) (30.8%, *f* = 28), with the lowest reported average as under 11 years old (elementary school age) (1.1%, *f* = 1) (see Table 2.18). The majority of the respondents received their most recent woodworking safety training during adulthood, either after entering the workforce or during professional and collegiate experiences. This pattern indicated that ongoing training opportunities beyond secondary education may play an important role in maintaining woodworking safety knowledge among SBAE agricultural mechanics instructors (McKim & Saucier, 2011; Wells & Hainline, 2021).

Table 2.18. Woodworking safety preparation: Instructor average age when received last safety training for stationary woodworking equipment (n = 91)

Variable Category	*f*	%
>22 years old (adult age)	30	33.0
19-22 years old (college age)	28	30.8
Never	18	19.8
15-18 years old (high school age)	11	12.1
12-14 years old (middle school age)	3	3.3
Under 11 years old (elementary school age)	1	1.1

Participants also evaluated their agreement with the statement, "I have received enough safety training to keep my students safe when using stationary woodworking equipment." This item served as a direct measure of perceived safety preparedness and provided insight into instructors' self-assessments regarding their readiness to supervise students in woodworking laboratory environments. Using Lindner and Lindner's (2024) convention for reporting Likert-type data, the mean response (*M* = 4.46, *SD* = 0.66) indicated a level of agreement, and the mode (*Mode* = 5, 53%) indicated a strong level of agreement to the statement "I have received enough safety training to keep my students safe when using stationary woodworking equipment" (see Table 2.19).

Table 2.19. Woodworking safety preparation: Instructor perception of their safety training for stationary woodworking equipment (n = 91)

Variable Category	*f*	%
Strongly Agree	49	53.8
Somewhat Agree	36	39.6
Neither Agree nor Disagree	5	5.5
Somewhat Disagree	1	1.1
Strongly Disagree	0	0.0

Descriptive statistical analyses were used to summarize respondents' safety training experiences, machine-specific preparation, confidence levels, and participation in professional development. Where appropriate, inferential analyses were also conducted to examine relationships among safety preparation variables and selected instructor characteristics. The findings from this research question related to a broader understanding of how woodworking safety competencies are developed within agricultural education and may assist teacher educators, state agricultural education leaders, and professional development providers in designing targeted safety training initiatives that strengthen laboratory safety culture and, along with instructional preparedness, among current and future SBAE agricultural mechanics instructors.

Conclusions and Recommendations

Conclusions

The purpose of this study was to examine the developmental experiences through which Georgia SBAE agricultural mechanics instructors acquired knowledge of woodworking machinery, perceived developed confidence in using and teaching woodworking equipment, and perceived their preparedness to safely supervise students in woodworking laboratory settings. As agricultural mechanics programs continue to serve as a critical component of agricultural education, understanding the pathways through which instructors develop technical competence and safety preparedness remains essential for improving teacher preparation, professional development, and laboratory safety practices (Burris et al., 2005; Hainline & Wells, 2024; McKim & Saucier, 2011).

Findings from the first research question revealed that knowledge of woodworking machinery developed through multiple experiential contexts rather than a single source of preparation. Instructors reported acquiring knowledge through formal educational experiences, including middle school and high school agricultural education, collegiate coursework, and professional development opportunities, as well as through occupational experiences, family influences, hobbies, self-directed learning, and other nonformal contexts. These findings support prior agricultural mechanics research identifying experiential learning and repeated application of technical skills as essential components of agricultural mechanics competency development (Byrd et al., 2015; Granberry et al., 2023; Hubert et al., 2001; Wells et al., 2013). The diversity of developmental pathways identified in this study reinforces the importance of experiential learning within agricultural mechanics education and highlights the varied backgrounds from which instructors enter the profession.

Discoveries from the second research question examined the instructors' perceptions regarding the developmental experiences related to their confidence in using and teaching woodworking machinery. The findings suggested that confidence was associated with multiple forms of exposure, including collegiate instruction in undergraduate programs, student teaching experiences, machine-specific training, and professional learning opportunities. An additional significant finding was the strong positive relationship between instructors’ confidence in personally using stationary woodworking equipment and their confidence in teaching students to use the equipment. The results indicated that instructors who reported higher levels of confidence operating woodworking machinery also reported higher levels of confidence teaching woodworking skills and supervising safe equipment use. The strength of this relationship highlights the importance of providing agricultural mechanics instructors with meaningful opportunities to develop technical proficiency, as increased competence with woodworking equipment may translate into greater instructional confidence and preparedness. These findings support previous agricultural education research indicating that technical confidence is strongly related to prior experiences and opportunities for skill development (Clark et al., 2021; Hainline & Wells, 2019).

Research question three explored differences in reported sources of agricultural mechanics knowledge across selected personal and professional characteristics. Findings indicated that instructors’ perceptions of knowledge development were associated with factors such as the instructors’ average age (30-49 years), teaching experience (11-15 years), educational background in a rural school setting, and program context. These results suggested that developmental experiences are not uniform across the profession and that individual pathways into agricultural mechanics instruction vary substantially. Similar findings have been reported within agricultural education literature, where teacher preparation experiences and professional backgrounds have been shown to relate to technical competency and instructional confidence (McKim & Saucier, 2013; Rasty et al., 2017; Trickett et al., 2023).

Research question four examined instructors' perceptions of preparation for woodworking safety. Findings indicated that safety preparation was derived from multiple training contexts, including secondary agricultural education programs, collegiate coursework, professional development workshops, employment experiences, and informal learning environments. While many instructors reported receiving safety training and expressed confidence in their ability to supervise students safely, the findings also suggested variability in the timing, frequency, and comprehensiveness of safety preparation experiences. Machine-specific safety training, collegiate instruction, and professional learning opportunities appeared to be significantly associated with instructors' perceptions of preparedness. These findings are consistent with previous studies emphasizing the importance of continuous safety training and laboratory management preparation for agricultural mechanics instructors (Hancock et al., 2023; Hubert et al., 2001; Hubert et al., 2003; McKim & Saucier, 2011; Saucier & McKim, 2011; Toft et al., 2021).

The findings suggest that woodworking knowledge is perceived as adequate, and that teaching confidence and safety preparedness are perceived as strong among SBAE agricultural mechanics instructors, who are developed through a complex combination of formal and informal learning experiences. No single educational experience appears sufficient to fully prepare instructors for the technical and supervisory responsibilities associated with woodworking instruction. Rather, preparation appears to be cumulative, with knowledge, confidence, and safety awareness developing over time through repeated exposure to woodworking equipment, instructional practice, and professional learning opportunities.

Implications

Several important implications emerged from this study. First, the findings suggested that teacher preparation programs should continue to emphasize hands-on agricultural mechanics instruction and machine-specific safety training experiences. Given these self-reported patterns, collegiate coursework appears to play an important role in developing instructors' perceptions of confidence and preparedness. Consistent with previous research demonstrating associations between practical laboratory experiences, technical competence, and instructional confidence among agricultural education teachers (Burris et al., 2005; Hainline & Wells, 2019; Wells & Hainline, 2021), these findings suggested that preservice teachers may benefit from meaningful opportunities to operate, maintain, and teach the use of woodworking machinery within supervised laboratory settings.

Second, the findings suggested that continuing professional development remains an important component of woodworking safety preparation and technical skill development. Participants identified professional development experiences as one of several contexts related to woodworking knowledge and confidence. Given the ongoing evolution of agricultural mechanics technologies, safety standards, and instructional practices (Clark et al., 2021; Hainline & Wells, 2024; Hancock et al., 2023; Hubert et al., 2001), these findings suggested that woodworking-related professional learning opportunities may help instructors maintain and expand their technical knowledge and safety awareness. In addition, these findings aligned with McKibben et al. (2022), who reported that repeated opportunities to practice agricultural mechanics skills in authentic settings strengthened participants' perceived confidence and readiness to teach technical content.

Third, the study revealed considerable variation in the experiences through which instructors reported developing woodworking knowledge and skills. Some participants identified employment, family members, and personal interests as important sources of learning, whereas others relied more heavily on collegiate coursework and professional development. These findings suggested that agricultural mechanics instructors enter the profession with diverse backgrounds and experiences. Consequently, professional development opportunities may be most effective when designed to accommodate varying levels of prior experience and technical expertise (McKim & Saucier, 2013; Rasty et al., 2017).

Fourth, the findings highlighted the continuing importance of safety preparation within agricultural mechanics education. Although respondents generally reported high levels of perceived safety preparedness, lower confidence levels associated with CNC routers suggested that not all woodworking equipment is perceived in the same way. These findings suggested that machine-specific safety training, laboratory management practices, and risk mitigation strategies remain important considerations for teacher preparation and professional development efforts (Hubert et al., 2003; McKim & Saucier, 2011; Saucier et al., 2014).

Finally, the strong positive relationship between confidence in using woodworking equipment and confidence in teaching woodworking equipment suggested that these constructs are closely related. Given these self-reported patterns, technical confidence and instructional confidence appeared to be highly related aspects of woodworking self-efficacy among SBAE agricultural mechanics instructors. Opportunities that support one dimension of confidence may also be associated with the other. This finding was consistent with Bandura’s (1997) assertion that mastery experiences contribute to efficacy beliefs and suggested that hands-on experiences with woodworking machinery may play an important role in the development of both technical and instructional confidence among SBAE agricultural mechanics instructors.

Recommendations

The findings of this study suggested several recommendations for practice, teacher preparation, and professional development within SBAE agricultural mechanics programs. Agricultural mechanics instructors should participate in recurring woodworking-specific safety training to maintain current knowledge of machinery operation, laboratory safety procedures, and student supervision practices as woodworking technologies, equipment designs, and safety standards continue to evolve (McKim & Saucier, 2011). Agricultural education programs should establish systematic procedures to document and update machine-specific safety certifications and training records for both instructors and students, promoting accountability and effective risk management. Additionally, school administrators should support agricultural mechanics instructors by providing funding opportunities, travel assistance, and release time to facilitate participation in woodworking-related professional development activities. Such support is essential to ensuring instructors have access to current training and resources necessary to maintain safe and effective instructional environments.

The results also highlighted the need for enhanced teacher preparation and professional development opportunities. Agricultural education teacher preparation programs should provide preservice teachers with increased opportunities for direct, hands-on instruction using stationary woodworking equipment, such as CNC routers and other equipment commonly found in SBAE laboratories (Burris et al., 2005; Wells & Hainline, 2021). Teacher preparation curricula should incorporate machine-specific safety instruction, laboratory management experiences, and structured student-teaching placements that allow preservice teachers to observe, practice, and reflect on agricultural mechanics instruction and safety supervision. Likewise, state agricultural education leaders and professional development providers should expand their PLU offerings focused on the operation, maintenance, and safety of woodworking machinery. Because instructors enter the profession with varying levels of technical expertise and prior experience, professional development opportunities should be differentiated to address both foundational and advanced training needs. Workshops should also incorporate emerging technologies, such as CNC routers, given that respondents reported never being trained on the equipment (86.8%, $f = 79$) and digital fabrication tools, while continuing to reinforce fundamental woodworking safety principles and laboratory management practices (Clark et al., 2021).

Several opportunities for future research emerged from this study. Future investigations should examine the relationship between instructors' confidence in using and teaching woodworking machinery and their actual instructional practices within agricultural mechanics laboratories. Researchers should also explore the relationship between instructor safety preparation and the perceived instructional effectiveness, as well as the effectiveness of collegiate coursework, professional development experiences, and industry-based training opportunities in developing woodworking competency among agricultural education instructors. Longitudinal studies examining the evolution of woodworking confidence, technical competence, and safety preparedness throughout an instructor's career may also provide additional insight into the development of self-efficacy over time (Bandura, 1997). Furthermore, replication studies conducted in other states would help determine whether the developmental pathways identified among Georgia SBAE instructors are consistent across agricultural education systems. Such research could provide valuable guidance for strengthening teacher preparation programs, professional development initiatives, and laboratory safety practices throughout agricultural education.

Chapter 3: Factors Influencing the Instructional Use of Stationary Woodworking Machinery in Georgia SBAE Agricultural Mechanics Programs: Perceptions, Decision-Making, and Barriers

Abstract

Woodworking instruction remains an important component of agricultural mechanics education, providing students with opportunities to develop technical skills, problem-solving abilities, and laboratory safety competencies through hands-on learning experiences. Despite the continued presence of stationary woodworking equipment in many School-Based Agricultural Education (SBAE) programs, limited research has examined how agricultural mechanics instructors determine which woodworking machines are most appropriate for classroom and laboratory instruction. Drawing from Bandura's (1997) self-efficacy theory, this study examined Georgia high school SBAE agricultural mechanics instructors' perceptions of the instructional value of stationary woodworking machinery and identified factors influencing the inclusion or exclusion of specific machines in instruction.

A descriptive correlational survey design was employed using a researcher-developed electronic questionnaire administered to Georgia SBAE agricultural mechanics instructors during the 2025-2026 academic year. A total of N = 91 usable responses were included in the analysis. Descriptive statistics, correlation analyses, and regression procedures were used to examine perceptions of the effectiveness of woodworking machinery, instructional decision-making criteria, instructor confidence, and barriers to the integration and implementation of woodworking.

Results indicated that instructors perceived stationary woodworking machines, including miter saws, table saws, band saws, drill presses, and sanders as the most *instructionally effective equipment for teaching woodworking concepts, technical skills, and safety procedures. Instructors reported using multiple criteria when determining the appropriateness of a machine, including the instructor's confidence in operating and teaching the equipment, perceived danger, liability concerns, and school support. Confidence in personally using woodworking machinery was strongly associated with confidence in teaching students to use the equipment. However, perceptions of danger and liability persisted regardless of instructors' confidence levels. Additional barriers included limited exposure to certain woodworking technologies during collegiate preparation, low participation in woodworking-focused professional development, and variations in perceived institutional support.*

The findings suggested that the implementation of woodworking machinery in SBAE programs is associated with interactions among instructor preparation, confidence, safety considerations, and program support. Results may inform teacher preparation programs, professional development initiatives, agricultural mechanics curriculum development, and efforts to strengthen woodworking instruction within agricultural education laboratories.

Key Words

School-Based Agricultural Education (SBAE), Agricultural Mechanics, Woodworking Instruction, Stationary Woodworking Equipment, Equipment Selection, Instructional Decision, Liability Concerns, Laboratory Management, and Program Support

Introduction and Review of Literature

Agricultural mechanics laboratories are a key component of many school-based agricultural education (SBAE) programs, providing spaces where students apply academic knowledge to authentic technical tasks and develop skills relevant to agriculture and related industries (Barrick, 1989; Love, 1978; Miller, 2006). Within these labs, woodworking remains a common focus, especially in programs that maintain traditional shop facilities with stationary floor machinery such as table saws, band saws, jointers, planers, and drill presses, as reflected in Georgia Agricultural Mechanics Technology I standards emphasizing woodworking safety, tool use, and project construction (Georgia Agricultural Education, n.d.). Woodworking projects allow students to practice measurement, layout, tool use, and problem-solving while engaging mathematics, science, and engineering (STEM) concepts (Parr & Edwards, 2004; Ramsey & Edwards, 2011). As agriculture education increasingly emphasizes STEM integration, systems thinking, and project-based learning, woodworking laboratories can serve as important venues for applied, experiential instruction (Charoenmuang et al., 2024; Coleman et al., 2024; Rice & Merrick, 2023).

Latest research underscores the value of laboratory experiences and project-based environments for developing students' understanding and engagement in learning. Case studies of fabrication labs and problem-based learning settings show that hands-on technical experiences and kinesthetic learning can enhance scientific reasoning, content retention, and systems thinking (Coleman et al., 2020, 2021; Rice & Merrick, 2023; Volk et al., 2025). Research on agricultural literacy and STEM integration further positions SBAE courses as key contexts in which you make sense of complex agricultural processes and connect classroom learning to real-world applications (Brune et al., 2020; Charoenmuang et al., 2024; Gawryla & Curry, 2022; Lemley, Alley, & Morrison, 2024). Parents similarly report valuing school-based agricultural learning, especially when it is hands-on and application-oriented (Miller et al., 2025). In a broader context, woodworking floor machinery functions not only as equipment but as a set of instructional resources that shape the quality and nature of students' learning in a main component of agricultural mechanics.

Simultaneously, woodworking laboratories present substantial safety and management challenges. Stationary woodworking machines carry a high risk of severe injury when used improperly, inadequately guarded, or poorly supervised. A synthesis of safety research in agricultural education laboratories indicates persistent safety and liability concerns, including inconsistent implementation of safety procedures and protective measures (Dyer & Andreasen, 1999). Studies of agricultural mechanics labs consistently highlight the teacher's central role in establishing safety expectations, modeling correct operation, and managing complex environments (McKim & Saucier, 2011, 2013; Saucier & McKim, 2011; Saucier et al., 2014). Research also shows variability in safety practices, such as the use of personal protective equipment, the provision of safety instruction, and the enforcement of rules and procedures (Chumbley et al., 2018; Saucier et al., 2014). These findings indicated that choices about which machines to use in instruction are shaped not only by curricular goals but also by teachers' perceptions of risk, their preparation and confidence, and the safety expectations of schools and districts.

An extensive literature review has examined SBAE teachers' preparation in agricultural mechanics, perceived technical competence, and professional development needs. Preservice and in-service teachers often report feeling less prepared to teach mechanics than other SBAE components, citing gaps in skills and limited exposure to certain content areas (Blackburn et al., 2015; Burris et al., 2005; Clark et al., 2021; Trickett et al., 2023; Whitehair et al., 2020). Research has identified ongoing professional development needs in technical knowledge, lab management, and safety across the mechanics discipline (Hainline & Wells, 2019, 2024; McKim & Saucier, 2011; Toft et al., 2021; Wells & Hainline, 2021; Wells, Hainline, Rank, et al., 2021). Other work links the adequacy and condition of tools and equipment to teachers' perceived competence and instructional decisions, suggesting that both resources and confidence shape how agricultural mechanics content is delivered (Byrd et al., 2015; McCubbins et al., 2016; McCubbins et al. 2017).

Despite these contributions, most research treats "agricultural mechanic" as a broad, undifferentiated category that combines welding, metal fabrication, power and machinery, structures, and electrical systems (Hainline & Wells, 2019; Wells et al., 2013; Wells, Hainline, Smalley, et al., 2021). Few studies focus specifically on woodworking and stationary woodworking machinery, as distinct instructional areas. Consequently, little is known about which woodworking floor machines SBAE teachers view as most effective for teaching concepts, skills, and safety, or about the criteria they use to decide whether to include particular machines in their courses. This lack of focus is concerning, given the distinct technical and safety procedures needed with woodworking machines and their continued presence in many high school agriculture programs.

Experiential learning and interpretive approaches help explain how teachers make decisions about equipment use. Experiential learning theory suggests that teachers develop professional judgment through repeated cycles of doing: reflecting, conceptualizing, and experimenting (Baker & Robinson, 2016; Baker et al., 2012; Dewey, 1938; Kolb, 1984; Roberts, 2006). In agricultural mechanics, teachers' past experiences operating machines, supervising students, and responding to safety incidents informed their views on which machines best support learning and which pose unacceptable risks (Coleman et al., 2020, 2021). Constructivist work similarly emphasizes that teachers design learning environments based on their evolving understandings of content mastery, pedagogy, and situational context (Glassman, 2001; Oyster & Bobbit, 2020). In woodworking labs, these understandings are reflected in choices about which machines to make available to students, how intensively to use the equipment, and what kinds of projects to assign.

Teacher confidence, often framed as self-efficacy, is a key factor in these choices. Studies in agricultural mechanics show that teachers' and preservice teachers' confidence in their technical and safety skills affects their willingness to use certain tools, implement the complexity of projects, and supervise all tasks, including higher-risk tasks (Blackburn et al., 2015; Granberry et al., 2022; McKibben et al., 2022; Tummons et al., 2017). Teachers with higher mechanics self-efficacy are more likely to view agricultural mechanics lab instruction as a challenge they are willing to take on and to persist in improving their practice (Granberry et al., 2022) Limited training, negative experiences, or strong liability concerns, by contrast, may lead teachers to avoid certain machines or tightly restrict student access, regardless of potential instructional value (Dyer & Andreasen, 1999; McKim & Saucier, 2011; Saucier & McKim, 2011; Saucier et al., 2014).

Contextual and instructional factors further shape equipment selection. Shop size and layout, machine condition, availability of guards and safety devices, administrative or district restrictions, perceived liability, and alignment with curriculum are all associated with the selection of woodworking machines (Byrd et al., 2015; McCubbins et al., 2016, 2017; McKim & Saucier, 2013). Teachers must balance these constraints with goals such as maximizing instructional versatility, supporting student engagement, and protecting student safety. Emerging work on equity and access has also suggested that decisions about lab activities and equipment availability may affect which students fully participate in hands-on learning (Lemley, Alley, & Clary, 2024; Lemley, Alley, & Morrison, 2024), underscoring the importance of understanding how these decisions are made.

In Georgia, SBAE programs operate in diverse rural, suburban, and urban settings and serve students with varying levels of prior agricultural and technical experiences (Ramsey et al., 2025). As state and national initiatives promote STEM integration, experiential learning, and project-based learning approaches in agricultural education (Charoenmuang et al., 2024; Toombs et al., 2022; Volk et al., 2025), Georgia agricultural mechanics instructors must decide how to use the woodworking equipment in their laboratories with the most effective intent. Yet limited empirical evidence describes which woodworking floor machines these instructors view as most instructionally valuable, what criteria they prioritize when selecting equipment, how their confidence relates to these selections, and what barriers shape or constrain their equipment choices.

This study addressed that gap by examining Georgia high school (grades 9-12) SBAE agricultural mechanics instructors' perceptions of the instructional value of woodworking floor machinery. Specifically, it (a) identified which woodworking floor machines instructors consider most effective for teaching woodworking concepts, skills, and safety; (b) described the criteria they report using when determining whether a machine is appropriate for classroom and laboratory instruction (e.g., safety risk, instructional versatility, student engagement, shop layout, equipment availability, curriculum alignment); (c) examined the extent to which the instructors' confidence in teaching machine operation and safety predicts the likelihood of selecting specific machines for instruction; and (d) recognized potential barriers, such a liability concerns, lack of training, equipment condition, facility limitations, and administrative restrictions, that may relate to whether instructors include or exclude particular woodworking machines. In documenting these perceptions and decision-making factors, the study aims to inform teacher preparation, professional development, safety planning, and facility design to support safe, effective, and equitable woodworking instruction in Georgia agricultural mechanics programs.

Theoretical Framework

Bandura's (1997) self-efficacy theory provides the central framework for this study of Georgia SBAE agricultural mechanics instructors' use of woodworking machinery and safety practices. Self-efficacy refers to people's beliefs about their ability to carry out the actions needed to achieve desired outcomes in specific tasks and contexts, and these beliefs are associated with their choices, effort, persistence, and responses to difficulties (Bandura, 1997; Harder et al., 2021). In technical, laboratory-based settings such as agricultural mechanics shops, self-efficacy can be understood as teachers’ confidence in operating equipment, teaching students to use it, and managing safety. Research shows that preservice and in-service SBAE teachers often feel less confident in mechanics than in other parts of the curriculum and may feel underprepared to supervise labs and enforce safety, which can lead to anxiety, avoidance, or restricted use of facilities (Blackburn et al., 2015; Burris et al., 2005; McKim & Saucier, 2011; Saucier & McKim, 2011; Tummons et al., 2017; Whitehair et al., 2020). Recent work links technical experience directly to mechanics' self-efficacy, showing that meaningful, hands-on opportunities in supportive settings strengthen confidence, while limited or absent shop exposure constrains it (Granberry et al., 2022; McKibben et al., 2022).

Bandura's (1997) framework was used primarily as a lens for interpreting relationships among training experiences, confidence, and instructional practices rather than as a fully operationalized theoretical model. Mastery experiences, or successful performance of relevant tasks, are built when teachers personally use woodworking machinery in high school and collegiate courses, in industry work, in personal projects, or through hands-on professional development. Studies in agricultural mechanics show that the amount and depth of coursework and laboratory experience in mechanics are associated with perceived competence and readiness (Byrd et al., 2015; Clark et al., 2021; Granberry et al., 2023; Wells et al., 2013).

Vicarious experiences occur as teachers observe mentors, cooperating teachers, and colleagues competently managing labs and modeling safe equipment use; such observations shape beliefs about what is attainable through the instructors’ perceptions (Gorter & Swan, 2018; Toombs et al., 2022; Trickett et al., 2023). Social persuasion, involving encouragement, feedback, and expectations from university faculty, mentors, administrators, and professional development facilitators, can further build or erode confidence, especially when tied to structured, skill-building professional development in mechanics (Hainline & Wells, 2019, 2024; Toft et al., 2021; Wells & Hainline, 2021). Finally, teachers' physiological and emotional reactions in the lab (e.g., anxiety, stress, and enjoyment) inform how capable they feel; fear around high-risk tools may lower self-efficacy and promote avoidance, whereas positive emotions associated with successful projects can reinforce confidence (McKim & Saucier, 2011; Saucier & McKim, 2011; Tummons et al., 2017).

Within this framework, the "sources" of woodworking machinery skill development and safety knowledge (e.g., high school coursework, FFA involvement, collegiate labs, professional training, personal experience) are viewed as key contexts in which efficacy-relevant information accumulates. Teachers' reports of where they learned woodworking and safety reflect mastery, vicarious, and socially persuasive experiences, as well as the affective responses available to them across their careers. Recent investigations have demonstrated continuing agricultural mechanics professional development needs among practicing teachers (Croom et al., 2026; Faulk et al., 2024), further supporting the need to better understand woodworking instruction within SBAE. Differences in self-efficacy and perceived preparation are also shaped by contextual factors such as equipment adequacy and program resources; teachers in well-equipped shops may have more frequent, higher-quality opportunities to practice and refine woodworking skills than those in under-resourced facilities (McCubbins et al., 2016; McCubbins et al., 2017).

Personal and professional characteristics, including gender and experience level, may be associated with access to these experiences and their interpretation (Granberry et al., 2022; McKim & Saucier, 2013). Applied to this study, self-efficacy theory helps explain why some instructors readily incorporate a range of woodworking machines into instruction while others avoid or limit their use, and why perceptions of gaps and training needs vary among teachers. The Harder et al. (2021) study thus interpreted patterns in reported experiential sources, equipment use, and perceived needs as reflections of underlying woodworking-related self-efficacy, consistent with broader calls for explicit, theory-guided work in agricultural education.

In this study, the selection of woodworking machines is conceptualized as an instructional decision associated with teachers' woodworking-related self-efficacy. Self-efficacy is expected to vary with prior woodworking experience, training opportunities, and contextual resources. Higher levels of woodworking self-efficacy are anticipated to be associated with greater willingness to incorporate a broad range of woodworking floor machinery into instruction and fewer perceived barriers to equipment use.

Purpose and Objectives

The purpose of this study was to examine Georgia high school (grades 9-12) school-based agricultural education (SBAE) agricultural mechanics instructors' perceptions of the instructional value of woodworking floor machinery and to identify factors that are associated with the selection or exclusion of specific machines for classroom and laboratory instruction. Grounded in Bandura's (1997) self-efficacy theory, the study examined how teachers' confidence in operating and teaching woodworking machines, along with contextual constraints, shapes equipment-use decisions.

The specific objectives of the study were to

1. Identify which woodworking floor machines Georgia SBAE agricultural mechanics instructors perceive as most instructionally effective for teaching woodworking concepts, skills, and safety.

2. Describe the criteria Georgia SBAE agricultural mechanics instructors use to determine whether a woodworking machine is appropriate for classroom instruction (e.g., safety risk, level of danger, level of difficulty, liability, and school support).

3. Determine the extent to which SBAE agricultural mechanics instructors' confidence in teaching machine operation and safety predicts their likelihood of selecting specific woodworking floor machines for instruction.

4. Examine the barriers (e.g., liability concerns, training level, equipment condition, facility availability, administrative restrictions) influencing whether Georgia SBAE agricultural mechanics instructors choose to include or exclude specific woodworking machines in instruction.

Methods

This investigation used a quantitative, nonexperimental research approach employing a descriptive-correlational survey methodology to examine Georgia high school (grades 9–12) SBAE agricultural mechanics instructors' perceptions regarding the instructional value of woodworking floor machinery and the factors influencing equipment selection within agricultural mechanics laboratories (Creswell & Creswell, 2018; Fraenkel et al., 2019). A survey-based approach was appropriate because the study sought to gather information from practicing instructors on their perceptions, experiences, confidence levels, and decision-making processes regarding the use of woodworking machinery in instructional settings.

The descriptive component of the design was used to identify which woodworking floor machines instructors perceived as most effective for teaching woodworking concepts, technical skills, and safety practices. The examination of relationships among instructors' confidence in operating and teaching woodworking machinery, perceived instructional effectiveness, equipment selection preferences, and barriers associated with machine use. Because the study focused on naturally occurring perceptions and experiences without manipulating variables or treatments, a nonexperimental design was deemed appropriate (Fraenkel et al., 2019).

Bandura's (1997) self-efficacy theory served as the conceptual framework guiding the study. Within this framework, instructors' confidence in operating woodworking machinery, teaching machine operation, and managing laboratory safety was viewed as a potential pattern consistent with instructional decision-making. Consequently, the study examined whether variations in woodworking-related self-efficacy were associated with instructors' perceptions of machine effectiveness, their likelihood of incorporating specific woodworking machines into instruction, and the barriers they identified when making equipment-use decisions. Although this study did not test Bandura's (1997) complete theoretical model, the framework aligns with recent agricultural mechanics research examining teacher self-efficacy within laboratory instruction (McKibben et al., 2022).

Participants

Participants for this study were drawn from Georgia high school school-based agricultural education (SBAE) instructors who taught agricultural mechanics courses that included woodworking instruction during the 2025-2026 academic year. The study focused specifically on instructors responsible for agricultural mechanics instruction, as they were the educators most directly involved in decisions regarding the use of woodworking floor machinery, safety supervision, and equipment selection in SBAE laboratory settings.

The sampling frame was developed using Georgia Agricultural Education Department records. Instructors were considered eligible if they were assigned to a school-based agricultural education program and were listed as teaching at least one agricultural mechanics course during the Fall 2025 or Spring 2026 semester. Because the study centered on woodworking floor machinery, the questionnaire also included a screening item to verify that participants had taught agricultural mechanics content involving woodworking. Respondents who indicated they had not taught woodworking-related content were excluded from the final study population.

A census approach was used to recruit participants (Creswell & Creswell, 2018). Rather than selecting a sample from the population, all eligible instructors identified through the Georgia Agricultural Education Department directory were invited to participate. The original directory included 145 instructors associated with agricultural mechanics instruction. Before data collection began, the list was reviewed and refined. Five individuals were removed because they were no longer employed in teaching positions during Spring 2026, and the researcher was removed from the list to prevent self-participation and reduce potential bias.

Data were collected electronically through Qualtrics. The survey opened on March 20, 2026, and remained available until May 7, 2026. Recruitment included an initial email invitation followed by reminder messages distributed throughout the 7-week collection period. During the first distribution, 13 email invitations were returned as undeliverable because of invalid addresses, school-system filtering, spam-blocking settings, or individual inbox restrictions. When possible, the researcher followed up by sending individualized Qualtrics links to affected instructors via alternative contact methods, resulting in eight additional completed responses.

A total of 106 instructors accessed or responded to the questionnaire during the data collection period. One individual indicated that they would not participate and was removed from the response pool. Responses were then reviewed for completeness. Because incomplete submissions yielded limited usable data for the variables central to this article, respondents who completed fewer than 50% of the questionnaire were excluded from the analysis. Most of these incomplete responses were missing substantial portions of the participant characteristics section and other key items related to equipment use, confidence, and instructional decision-making.

Following screening and data-cleaning procedures, 91 usable responses remained for analysis, producing a utilizable response rate of 85.8%. The final group of respondents represented Georgia SBAE agricultural mechanics instructors from varied school settings, teaching levels, years of experience, and agricultural mechanics program sizes. This respondent group provided an appropriate basis for examining instructors' perceptions of woodworking floor machinery, perceived instructional effectiveness, confidence in equipment use, and factors influencing the inclusion or exclusion of specific woodworking machines in agricultural mechanics instruction.

To evaluate potential patterns consistent with nonresponse bias, respondent characteristics were compared by survey response timing for agricultural education survey research (Lindner, 2002; Lindner et al., 2001). Participants were classified as either early respondents, those submitting the questionnaire within the first 25 days of the data collection period, or late respondents, those submitting it within the final 25 days. Independent samples *t*-tests were conducted to compare the two groups on selected study variables, including woodworking knowledge, confidence in using woodworking equipment, perceptions of training adequacy, and personal knowledge of woodworking equipment. Results indicated no statistically significant differences between early and late respondents across the variables examined ($p > .05$). Therefore, response timing did not appear to be associated with participant responses, providing evidence that the data were reasonably representative of the accessible population. This interpretation is consistent with recommendations for evaluating nonresponse error in agricultural education survey research (Lindner, 2002).

Participant Characteristics

The respondent group ($N = 91$) included Georgia SBAE agricultural mechanics instructors representing a wide range of personal and professional backgrounds. Participants varied considerably in years of teaching experience, school location, age, and instructional assignments, providing perspectives from instructors working in diverse agricultural education contexts throughout the state. The largest proportion of respondents reported between 11 and 15 years of SBAE teaching experience (23.1%, $n = 21$), followed closely by instructors with 6 to 10 years of experience (22.0%, $n = 20$). Most participants indicated that their primary teaching assignment was at the high school level (89.0%, $n = 81$), reflecting the study’s focus on woodworking instruction within secondary agricultural mechanics programs.

Respondents represented agricultural education programs located in a variety of community settings. Approximately two-thirds of the participants taught in rural communities (65.9%, *n* = 60), while the remaining respondents were employed in town (20.9%, n = 19) and suburban (12.1%, n = 11) school settings. The age distribution reflected both novice and experienced educators, with the largest age categories being 40-49 years (29.7%, *n* = 27) and 30-39 years (28.6%, *n* = 26). The age and experience distributions suggested that the respondent pool included instructors at multiple stages of their professional careers.

The sample was predominantly male (84.6%, *n* = 77) and included those identifying as female (14.3%, *n* = 13) (see Table 3.1). Overall, the respondents represented a broad cross-section of Georgia agricultural mechanics instructors, encompassing diverse educational backgrounds, levels of experience, community settings, and program characteristics. This diversity provided a comprehensive perspective for examining the instructors' perceptions of woodworking floor machinery, instructional decision-making, and equipment-use practices within SBAE agricultural mechanics programs.

Table 3.1. Participant characteristics (n = 91)

Variable Category	*f*	%
Gender		
Male	77	84.6
Female	13	14.3
Did Not Answer	1	1.1
Community		
Rural	60	65.9
Town	19	20.9
Suburban	11	12.1
Did Not Answer	1	1.1
Age		
40-49	27	29.7

Variable Category	*f*	%
30-39	26	28.6
20-29	17	18.7
50-59	16	17.6
60-69	3	3.3
Did Not Answer	2	2.2
Years of SBAE Teaching Experience		
11-15	21	23.1
6-10	20	22.0
0-5	14	15.4
21-25	12	13.2
16-20	11	12.1
26-30	8	8.8
31 and Greater	3	3.3
Did Not Answer	2	2.2
Current Teaching Level		
High School (9-12 Grades)	81	89
Georgia State Staff	4	4.4
Both Middle and High School (6-12 Grades)	3	3.3
Middle School (6-8 Grades)	2	2.2
Did Not Answer	1	1.1

Instrumentation and Data Analysis

Data were collected using a researcher-developed electronic questionnaire administered through Qualtrics. The questionnaire was distributed electronically to Georgia SBAE agricultural mechanics instructors who met the study eligibility requirements. The instrument was designed to investigate instructors' perceptions of the instructional effectiveness of woodworking floor machinery, the factors influencing equipment selection decisions, confidence in teaching machine operation and safety, and barriers to implementing woodworking equipment in agricultural mechanics laboratories.

Questionnaire items were developed following an extensive review of literature related to agricultural mechanics instruction, laboratory safety, teacher self-efficacy, equipment adequacy, professional development, and agricultural mechanics teacher preparation (Burris et al., 2005; Clark et al., 2021; Hainline & Wells, 2019, 2024; McCubbins et al., 2016, 2017; McKim & Saucier, 2011; Wells & Hainline, 2021). Bandura’s (1997) self-efficacy theory provided the conceptual foundation for items related to instructional confidence and equipment-use decisions. The questionnaire consisted of Likert-type scales, semantic differential items, categorical response items, checklist questions, and matrix-style response formats aligned with the study objectives.

The stationary woodworking floor machinery examined in this study was identified from the Georgia Agricultural Education recommended equipment list for agricultural mechanics laboratories, ensuring that the equipment evaluated reflected machinery commonly available and utilized within Georgia SBAE programs. Equipment included sanders, drill presses, jointers, planers, routers or shapers, computer numerical control (CNC) routers, band saws, miter saws, panel saws, radial arm saws, scroll saws, and table saws.

Woodworking Machinery Implementation

The participants evaluated the perceived instructional effectiveness of individual woodworking machines for teaching woodworking concepts, technical skills, and safety procedures. Respondents identified which machines they believed provided the greatest educational value for student learning and skill development. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize perceptions of instructional effectiveness and identify the woodworking machines most frequently perceived as valuable instructional tools.

Equipment Selection Criteria

Secondly, an examination of the factors instructors considered when determining whether a woodworking machine was appropriate for classroom and laboratory instruction. Participants responded to a series of semantic differential and Likert-type items measuring perceptions of safety risk, level of danger, operational complexity, liability concerns, and school support. Descriptive statistical procedures were used to summarize the relative importance of each criterion and to identify the factors most strongly influencing equipment selection decisions.

Confidence and Equipment Selection

Then the questionnaire investigated the extent to which instructors' confidence in teaching machine operation and safety predicted their likelihood of selecting specific woodworking machines for instructional use. Participants rated their confidence in personally operating and teaching the safe use of each woodworking machine on a 5-point Likert-type scale ranging from not confident to confident. Composite confidence scores were calculated where appropriate. These analyses were intended to determine whether higher levels of woodworking-related self-efficacy were associated with greater willingness to incorporate specific woodworking machines into instruction.

Barriers to Woodworking Equipment Use

The fourth research question explored factors that may encourage or discourage the inclusion of woodworking machinery in SBAE agricultural mechanics laboratories. Participants responded to items addressing liability concerns, previous training experiences, equipment condition, facility limitations, machine availability, administrative restrictions, consumable resources, and program support. Descriptive statistics were used to identify the most frequently reported barriers and determine the extent to which these factors were associated with instructors' decisions to include or exclude specific woodworking machines from instructional activities.

Personal characteristics and professional background information were also collected to describe the participant population and provide context for interpreting the findings. Variables included age, gender, teaching experience, educational attainment, certification pathway, school setting, teaching assignment, agricultural mechanics course offerings, and program size. These characteristics were selected based on prior research identifying relationships among teacher background characteristics, agricultural mechanics preparation, instructional confidence, and professional development needs (Hainline & Wells, 2024; McKim & Saucier, 2013; Rasty et al., 2017; Trickett et al., 2023).

Validity

Several procedures were employed to establish the validity of the researcher-developed instrument. Content validity was addressed through an extensive review of the literature on agricultural mechanics education, woodworking instruction, laboratory safety, equipment adequacy, instructional decision-making, and teacher self-efficacy. The instrument was designed to address multiple dimensions of woodworking instruction identified in recent agricultural education literature, including instructor confidence, technical competence, safety preparation, and instructional decision-making (Clemons et al., 2018; McKibben et al., 2022). Particular attention was given to ensuring that the questionnaire items adequately represented the constructs associated with the implementation of woodworking machinery, perceived instructional effectiveness, confidence, and barriers to equipment use.

Face and content validity were further strengthened through review by individuals possessing expertise in agricultural mechanics education, agricultural education research, laboratory safety, and SBAE instruction. Reviewers evaluated the instrument for clarity, appropriateness of terminology, alignment with the study objectives, and relevance to current agricultural mechanics teaching practices. Recommendations from the review process were incorporated to revamp item wording, reduce ambiguity, and strengthen alignment between questionnaire items and the four research questions examined in this study. Collectively, the literature review and expert review processes provided evidence of face and content validity, supporting the instrument's appropriateness and comprehensiveness for measuring the topics of interest.

Although evidence of face and content validity was established, no formal construct validation procedures were conducted. Specifically, exploratory factor analysis, confirmatory factor analysis, or other statistical procedures commonly used to establish construct validity, mathematically, were not performed. Therefore, the composite variables and measures used in this study should be interpreted as operationalized measures developed to address the research objectives rather than as psychometrically validated constructs.

Reliability

Internal consistency reliability was assessed using Cronbach’s alpha coefficient (Clemons & Lindner, 2025). Reliability analysis was conducted in SPSS using 94 scaled questionnaire items related to the implementation of woodworking machinery, instructional confidence, safety perceptions, equipment selection factors, and implementation barriers. The instrument demonstrated excellent internal consistency reliability ($\alpha = .944$, $N = 94$). According to George and Mallery (2020), Cronbach's alpha coefficients greater than .90 indicate excellent reliability among instrument items.

The resulting reliability coefficient suggested a high degree of consistency among the scaled measures used throughout the study. This level of reliability supported the use of composite variables that represent broader constructs, such as confidence in teaching woodworking machinery, perceived instructional effectiveness, and barriers to implementation. Because the questionnaire included multiple response formats, including Likert-type scales, matrix items, checklist questions, and categorical responses, the reliability coefficient was interpreted as evidence of consistency among the scaled portions of the instrument rather than evidence of a single underlying construct. Nevertheless, the reliability findings indicated that the instrument was appropriate for examining relationships among instructional confidence, equipment-selection decisions, and barriers to woodworking machinery implementation within Georgia SBAE agricultural mechanics programs.

Findings

Research Question 1: Which woodworking floor machines do Georgia agricultural mechanics instructors identify as instructionally effective for teaching woodworking concepts, skills, and safety?

The first research question sought to identify which stationary woodworking machines Georgia SBAE agricultural mechanics instructors perceived as instructionally effective for teaching woodworking concepts, technical skills, and safety. Perceived instructional effectiveness was examined through instructors' reported knowledge of woodworking equipment, machine-specific safety training experiences, collegiate preparation, confidence in personally using the equipment, confidence in teaching students to use the equipment, and participation in professional learning opportunities (PLUs) related to stationary woodworking machinery.

Participants first reported their overall knowledge of stationary woodworking equipment. Respondents rated their knowledge from none (scale category 0) to high (scale category 3). The mean knowledge level for stationary woodworking equipment was (M = 2.41, SD = 0.56), indicating that respondents reported an adequate level of knowledge. More than half of the respondents indicated their knowledge of woodworking equipment was adequate (52.7%, *f* = 48), while (44.0%, *f* = 40) reported a high level of knowledge, and (2.3%, *f* = 3) reported a low level of knowledge (see Table 3.2). These findings suggested that most instructors perceived they had sufficient knowledge of stationary woodworking equipment to support instructional activities.

Table 3.2. Skill development and knowledge: Knowledge of woodworking equipment (n = 91)

Variable Category	*f*	%
Adequate	48	52.7
High	40	44.0
Low	3	2.3

To further examine machine-specific preparation, respondents identified whether they had received safety training on the 12 identified pieces of stationary woodworking equipment. The highest percentages of reported safety training occurred with table saws and miter saws (74.7%, *f* = 68), followed by band saws (64.8%, *f* = 59), drill presses and radial arm saws (60.4%, *f* = 55), sanders (56.0%, *f* = 51), and planers (54.9%, *f* = 50). The lowest proportion of respondents reported safety training on CNC routers (22.0%, f = 20) (see Table 3.3). These findings indicated that instructors reported substantially greater exposure to safety training on stationary woodworking machinery than on emerging technologies such as CNC routers.

Table 3.3. Skill development and knowledge: Instructor received safety training on stationary woodworking equipment (n = 91)

Variable Category	*f*	%
Sander (belt, disc, or combination)		
No	40	44.0
Yes	51	56.0
Drill Press		
No	36	39.6
Yes	55	60.4
Jointer		
No	51	56.0
Yes	40	44.0
Planer		
No	41	45.1
Yes	50	54.9
Router or Shaper		
I don't know what this tool is.	1	1.1
No	49	53.8
Yes	40	44.0
CNC Router		
I don't know what this tool is.	1	1.1
No	70	76.9
Yes	20	22.0
Band Saw		
No	32	35.2
Yes	59	64.8
Miter Saw		
No	23	25.3
Yes	68	74.7
Panel Saw		
I don't know what this tool is.	1	1.1
No	61	67.0
Yes	29	31.9
Radial Arm Saw		
No	35	38.5
Yes	55	60.4
Did Not Answer	1	1.1
Scroll Saw		

Variable Category	*f*	%
I don't know what this tool is.	1	1.1
No	50	54.9
Yes	40	44.0
Table Saw		
No	23	25.3
Yes	68	74.7

Participants were also asked whether they received instruction on specific woodworking machines as part of their collegiate preparation programs. The highest reported levels of collegiate instruction were observed with table saws (*M* = 2.37, *SD* = 0.49), followed by band saws and miter saws (*M* = 2.36, *SD* = 0.48). CNC routers received the lowest level of collegiate instruction (*M* = 2.11, *SD* = 0.32), followed by panel saws (*M* = 2.12, *SD* = 0.36), and scroll saws (*M* = 2.17, *SD* = 0.38) (see Table 3.4). These findings suggested that teacher preparation programs provided greater exposure to traditional, more commonly found, woodworking equipment than to specialized or technologically advanced machinery.

Table 3.4. Skill development and knowledge: In the collegiate system the instructor received safety training on stationary woodworking equipment (n = 91)

Variable Category	*M*	*SD*	*f*	%
Table Saw	2.37	0.49	34	37.4
Band Saw	2.36	0.48	33	36.3
Miter Saw	2.36	0.48	33	36.3
Drill Press	2.33	0.47	30	33.0
Radial Arm Saw	2.31	0.46	28	30.8
Sander (belt, disc, or combination)	2.30	0.46	27	29.7
Planer	2.26	0.44	23	25.3
Router or Shaper	2.21	0.41	19	20.9
Jointer	2.21	0.41	19	20.9
Scroll Saw	2.17	0.38	15	16.5
Panel Saw	2.12	0.36	12	13.2
CNC Router	2.11	0.32	10	11.0

Respondents then evaluated their confidence in personally using stationary woodworking equipment. Respondents rated their confidence from not confident (scale category 1) to confident (scale category 5). The highest levels of confidence were reported for sanders (*M* = 4.86, *SD* = 0.38), miter saws (*M* = 4.85, *SD* = 0.39), drill presses (*M* = 4.74, *SD* = 0.71), table saws (*M* = 4.66, *SD* = 0.82), band saw (*M* = 4.64, *SD* = 0.82), radial arm saw (*M* = 4.48, *SD* = 1.02), planer (*M* = 4.34, *SD* = 1.08), router or shaper (*M* = 4.24, *SD* = 1.08), scroll saw (*M* = 4.17, *SD* = 1.22), panel saw (*M* = 4.03, *SD* = 1.28), and jointer (*M* = 3.99, *SD* = 1.28). However, CNC routers received the lowest confidence rating (*M* = 3.29, *SD* = 1.35), corresponding to neither confident nor not confident (Lindner & Lindner, 2024) (see Table 3.5). These findings indicated that instructors felt most confident operating commonly used woodworking equipment and least confident operating CNC routers.

Table 3.5. Confidence in teaching: Level of confidence in USING tools personally (n = 91)

Variable Category	*M*	*SD*
Sander (belt, disc, or combination)	4.86	0.38
Miter Saw	4.85	0.39
Drill Press	4.74	0.71
Table Saw	4.66	0.82
Band Saw	4.64	0.82
Radial Arm Saw	4.48	1.02
Planer	4.34	1.08
Router or Shaper	4.24	1.08
Scroll Saw	4.17	1.22
Panel Saw	4.03	1.28
Jointer	3.99	1.28
CNC Router	3.29	1.35

Similarly, respondents evaluated their confidence in teaching students to use stationary woodworking equipment. Respondents rated their confidence from not confident (scale category 1) to confident (scale category 5). The highest levels of confidence were reported for miter saws (*M* = 4.80, *SD* = 0.50), sanders (*M* = 4.77, *SD* = 0.47), table saws (*M* = 4.62, *SD* = 0.83), drill presses (*M* = 4.58, *SD* = 0.84), band saw (*M* = 4.51, *SD* = 0.96), radial arm saw (*M* = 4.31, *SD* = 1.14), planer (*M* = 4.26, *SD* = 1.19), router or shaper (*M* = 4.19, *SD* = 1.06), scroll saw (*M* = 4.14, *SD* = 1.23), panel saw (*M* = 3.98, *SD* = 1.32), and jointer (*M* = 3.86, *SD* = 1.37). As with personal-use confidence, CNC routers received the lowest teaching confidence rating (*M* = 3.22, *SD* = 1.37), corresponding to neither confident nor not confident (Lindner & Lindner, 2024) (see Table 3.6). Overall, instructors reported greater confidence teaching with stationary woodworking machines than teaching CNC router operation.

Table 3.6. Confidence in teaching: Level of confidence in TEACHING tools (n = 91)

Variable Category	*M*	*SD*
Miter Saw	4.80	0.50
Sander (belt, disc, or combination)	4.77	0.47
Table Saw	4.62	0.83
Drill Press	4.58	0.84
Band Saw	4.51	0.96
Radial Arm Saw	4.31	1.14
Planer	4.26	1.19
Router or Shaper	4.19	1.06
Scroll Saw	4.14	1.23
Panel Saw	3.98	1.32
Jointer	3.86	1.37
CNC Router	3.22	1.37

Professional development participation was examined through respondents' attendance at PLU workshops involving stationary woodworking equipment. Across all 12 machines, most instructors reported never having attended a PLU workshop focused on machine operation or safety. Table saws had the highest level of PLU participation (*M* = 0.37, *SD* = 0.79), with attendees reporting attendance at one or more PLU experiences. In contrast, panel saws received the lowest participation rate (*M* = 0.13, *SD* = 0.55) reporting attendance at a PLU workshop (see Table 3.7). These findings suggested that formal professional development opportunities related to woodworking machinery remain limited for many SBAE agricultural mechanics instructors.

Table 3.7. Skill development and knowledge: Instructor received safety training on stationary woodworking equipment (n = 91)

Variable Category	*M*	*SD*	*f*	%
Table Saw	0.37	0.79		
0 PLU Class			67	73.6
1 or more PLUs			22	24.2
Did Not Answer			2	2.2
Miter Saw	0.29	0.69		
0 PLU Class			73	80.2
1 or more PLUs			17	18.7
Did Not Answer			1	1.1
Sander (belt, disc, or combination)	0.28	0.77		
0 PLU Class			76	83.5
1 or more PLUs			14	15.4
Did Not Answer			1	1.1
Drill Press	0.27	0.73		
0 PLU Class			75	82.4
1 or more PLUs			15	16.5
Did Not Answer			1	1.1
Planer	0.26	0.65		
0 PLU Class			74	81.3
1 or more PLUs			16	17.6
Did Not Answer			1	1.1
Router or Shaper	0.26	0.65		
0 PLU Class			74	81.3
1 or more PLUs			16	17.6
Did Not Answer			1	1.1
Band Saw	0.26	0.65		
0 PLU Class			74	81.3
1 or more PLUs			16	17.6
Did Not Answer			1	1.1
Radial Arm Saw	0.24	0.68		
0 PLU Class			76	83.5
1 or more PLUs			14	15.4
Did Not Answer			1	1.1

Variable Category	*M*	*SD*	*f*	%
Scroll Saw	0.21	0.63		
0 PLU Class			78	85.7
1 or more PLUs			12	13.2
Did Not Answer			1	1.1
Jointer	0.20	0.60		
0 PLU Class			78	85.7
1 or more PLUs			12	13.2
Did Not Answer			1	1.1
CNC Router	0.19	0.58		
0 PLU Class			79	86.8
1 or more PLUs			12	13.2
Did Not Answer			0	0.0
Panel Saw	0.13	0.55		
0 PLU Class			83	91.2
1 or more PLUs			7	7.7
Did Not Answer			1	1.1

Research Question 2: What criteria do SBAE agricultural mechanics instructors report using when determining whether a woodworking machine is appropriate for classroom instruction (e.g., safety risk, level of danger, level of difficulty, liability, and school support)?

Research question two sought to identify the criteria that Georgia SBAE agricultural mechanics instructors reported using to determine whether stationary woodworking equipment was appropriate for classroom and laboratory instruction. Participants first reported whether they had received safety training on specific stationary woodworking machines. Respondents most frequently reported receiving safety training on table saws and miter saws (74.7%, *f* = 68), followed by band saws (64.8%, *f* = 59), drill presses and radial arm saws (60.4%, *f* = 55), sanders (56.0%, *f* = 51), and planers (54.9%, *f* = 50). Lower levels of safety training were reported for jointers, routers or shapers, and scroll saws (44.0%, *f* = 40), panel saws (31.9%, *f* = 29), and CNC routers (22.0%, *f* = 20) (see Table 3.3). These findings suggested that instructors may view machines with greater exposure to safety training as more appropriate for instructional use, while machines with lower levels of training may be approached more cautiously.

Respondents also rated their confidence in personally using stationary woodworking equipment. The highest confidence ratings were reported for sanders (*M* = 4.86, *SD* = 0.38), miter saws (*M* = 4.85, *SD* = 0.39), drill presses (*M* = 4.74, *SD* = 0.71), table saws (*M* = 4.66, *SD* = 0.82), and band saws (*M* = 4.64, *SD* = 0.82). The lowest confidence rating was reported for CNC routers (*M* = 3.29, *SD* = 1.35). Similarly, respondents reported the highest confidence in teaching students to use miter saws (*M* = 4.80, *SD* = 0.50), sanders (*M* = 4.77, *SD* = 0.47), table saws (*M* = 4.62, *SD* = 0.83), drill presses (*M* = 4.58, *SD* = 0.84), and band saws (*M* = 4.51, *SD* = 0.96). The lowest teaching confidence rating was again reported for CNC routers (*M* = 3.22, *SD* = 1.37) (see Tables 3.7 and 3.8). These findings suggest that personal operating confidence and teaching confidence were important criteria for instructors when considering whether a woodworking machine was appropriate for classroom instruction.

Respondents then evaluated broader concerns associated with teaching woodworking in agricultural mechanics, including difficulty, danger, liability, and school support. For perceived difficulty, *n* = 91 valid responses were analyzed. The mean difficulty rating was *M* = 3.90 (*SD* = 1.08), with a mode of *Mode* = 4, corresponding to “neither easy nor difficult.” Over half of valid respondents selected “neither easy nor difficult” (51.6%, *f* = 47), while 17.6% (*f* = 16) selected “somewhat difficult,” and 4.4% (*f* = 4) selected “difficult” (see Table 3.8). These findings suggested that respondents generally did not perceive woodworking instruction as overly difficult, although a portion of instructors reported some difficulty.

Table 3.8. Woodworking floor machines perceived instructional effectiveness: Difficulty (n = 91)

Difficulty Variable Category	*F*	%
Neither Easy nor Difficult	47	51.6
Somewhat Difficult	16	17.6
Somewhat Easy	9	9.9
Easy	6	6.6
Did Not Answer	5	5.5
Too Easy	4	4.4
Difficult	4	4.4
Too Difficult	0	0.0

For perceived danger, the mean rating was $M = 4.55$, $SD = 1.28$, with a median of $Mdn = 5$ and a mode of $Mode = 4$. The largest proportion of respondents selected "unsure" (27.5%, $f = 25$), followed by "very dangerous" (26.4%, $f = 24$), "highly dangerous" (18.7%, $f = 17$), "moderately dangerous" (9.9%, $f = 9$), "slightly dangerous" (7.7%, $f = 7$), and "extremely dangerous" (4.7%, $f = 4$) (see Table 3.9). These results indicated that danger was an important consideration for instructors, with many respondents perceiving woodworking instruction as involving moderate to high levels of risk.

Table 3.9. Woodworking floor machines perceived instructional effectiveness: Danger (n = 91)

Danger Variable Category	*F*	%
Unsure	25	27.5
Very Dangerous	24	26.4
Highly Dangerous	17	18.7
Moderately Dangerous	9	9.9
Slightly Dangerous	7	7.7
Did Not Answer	5	5.5

Danger Variable Category	*F*	%
Extremely Dangerous	4	4.4
Not Dangerous	0	0.0

For liability, respondents rated liability from “no liability concern” (scale category 1) to “extreme liability concern” (scale category 7). The mean rating was $M = 4.77$ ($SD = 1.48$), corresponding to “moderate liability concern.” Respondents most frequently selected “neither concerned nor unconcerned” and “high liability concern” (44%, $f = 40$), with each category representing 22.0% ($f = 20$) of valid responses (see Table 3.10). Additional respondents selected moderate liability (19.8%, $f = 18$) concern categories, while 12.1% ($f = 11$) reported extreme liability concern. These findings suggested that liability was highly relevant for determining whether woodworking machinery was appropriate for classroom instruction, particularly for machines that instructors perceived as more hazardous or difficult to supervise.

Table 3.10. Woodworking floor machines perceived instructional effectiveness: Liability (n = 91)

Liability Variable Category	*F*	%
Neither concerned nor Unconcerned	20	22.0
High Liability Concern	20	22.0
Moderate Liability Concern	18	19.8
Extreme Liability Concern	11	12.1
Moderate Liability Concern	9	9.9
Low Liability Concern	8	8.8
Did Not Answer	5	5.5
No Liability Concern	0	0.0

School support was also examined as a criterion influencing instructional appropriateness. The respondents rated the level of school support from “fully supported” (scale category 1) to “completely blocked” (scale category 7). The mean school support rating was *M* = 3.02 (*SD* = 1.74), with a mode of *Mode* = 1, corresponding to “fully supported.” The largest proportion of respondents reported that woodworking instruction was “fully supported” (26.4%, *f* = 24), followed by “neutral” (20.9%, *f* = 19), “mostly supported” (15.4%, *f* = 14), and “somewhat supported” (13.2%, *f* = 12). Others reported that woodworking instruction was “somewhat blocked” (8.8%, *f* = 8), “mostly blocked” (7.7%, *f* = 7), or “completely blocked” (2.2%, *f* = 2) (see Table 3.11). These findings indicated that most instructors perceived at least some degree of school support for woodworking instruction, although a smaller group reported a lack of school support.

Table 3.11. Woodworking floor machines perceived instructional effectiveness: School support (n = 91)

School Support Variable Category	*F*	%
Fully Supported	24	26.4
Neutral	19	20.9
Mostly Supported	14	15.4
Somewhat Supported	12	13.2
Somewhat Blocked	8	8.8
Mostly Blocked	7	7.7
Did Not Answer	5	5.5
Completely Blocked	2	2.2
Completely Blocked	2	2.2

To further examine the criteria instructors use to determine whether woodworking machinery is appropriate for classroom instruction, the relationships between instructors’ confidence in teaching woodworking equipment and their perceptions of danger and liability were explored using correlation analyses. Because the confidence in teaching composite was negatively skewed (skewness = -1.488), violating the assumption of normality, Spearman’s rank-order correlation was used as the primary measure of association.

A Spearman's rho correlation was conducted to examine the relationship between instructors' confidence in teaching stationary woodworking equipment and their perceptions of the danger associated with woodworking instruction. Results indicated a weak negative relationship between confidence in teaching and perceived danger, $r_s(83) = -.134$, $p = .228$. The relationship was not statistically significant, indicating that instructors' confidence in teaching woodworking equipment was not associated with their perceptions of the danger presented by woodworking instruction. For comparison, a Pearson correlation was also calculated and revealed a weak, nonsignificant negative relationship, $r(83) = -.156$, $p = .160$ (see Table 3.12).

Table 3.12. Relationship between confidence in teaching stationary woodworking equipment and perceptions of danger and liability associated with woodworking instruction (n = 83)

Variable	Spearman's rho (r_s)	p Value	Pearson's r	p Value	Interpretation
Confidence in Teaching x Perceived Danger	-.134	.228	-.156	.160	Weak negative, not significant
Confidence in Teaching x Perceived Liability	-.178	.108	-.207	.061	Weak negative, not significant

Note: Spearman's rank-order correlation was used as the primary measure of association because the confidence-in-teaching composite variable violated the assumption of normality (skewness = -1.488). Correlation coefficients are interpreted according to Cohen's (1988) guidelines. Negative coefficients indicate that higher confidence in teaching woodworking equipment was associated with slightly lower perceptions of danger and liability; however, neither relationship reached statistical significance (p> .05).

A second Spearman's rho correlation was conducted to examine the relationship between instructors' confidence in teaching stationary woodworking equipment and their perceptions of liability associated with woodworking instruction. Results revealed a weak negative relationship between confidence in teaching and perceived liability, $r_s(83)$

= -.178, p = .108. However, the relationship was not statistically significant. These findings suggested that instructors with higher levels of confidence in teaching woodworking equipment were not significantly less likely to perceive liability concerns associated with woodworking instruction. A Pearson correlation yielded similar results, indicating a weak, nonsignificant negative relationship ($r(83) = -.207$, $p = .061$). This indicated that SBAE agricultural mechanics instructors considered multiple criteria when determining whether woodworking machinery was appropriate for classroom instruction. Safety training, confidence in personal equipment use, confidence in teaching students, perceived difficulty, danger, liability, and school support all appeared related to instructional decision-making. The instructor's perceptions of danger and liability appear to be independent of their confidence in teaching with woodworking equipment.

Research Question 3: To what extent do SBAE agricultural mechanics instructors' confidence in teaching machine operation and safety predict the likelihood of selecting specific machines for instruction?

Research question three examined the extent to which SBAE agricultural mechanics instructors' confidence in teaching stationary woodworking equipment was related to factors that may be patterns consistent with machine selection for classroom instruction. Machine-selection likelihood was examined through related indicators, including safety training exposure, confidence in using equipment, confidence in teaching equipment, and perceptions of danger, liability, and school support. These variables provided insight into whether instructors' confidence in teaching woodworking machinery was associated with factors commonly used when determining whether a machine should be incorporated into agricultural mechanics instruction.

A multiple regression analysis was conducted to determine whether instructors' confidence in personally using individual pieces of stationary woodworking equipment predicted their overall confidence in teaching with the equipment. Personal use confidence ratings for the 12 identified woodworking machines were entered as predictor variables, and the teaching confidence composite served as the dependent variable. The overall regression model was statistically significant ($F(12, 73) = 49.24$, $p < .001$, $R^2 = .890$) (see Table 3.13). The model produced a strong multiple correlation ($R = .943$) and explained approximately 89.0% of the variance in teaching confidence. These findings indicated that instructors' confidence in personally using woodworking machinery was a strong predictor of their confidence in teaching students to use stationary woodworking equipment.

Table 3.13. Multiple regression analysis predicting confidence in teaching stationary woodworking equipment from confidence in personally using woodworking equipment (n = 86)

Model Statistic	Value
R	.943
R^2	.890
Adjusted R^2	.872
Standard Error or Estimate	0.267
F	49.24
Df	12, 73
P	< .001

Note. Dependent variable = Confidence in teaching stationary woodworking equipment. Predictor variables included confidence ratings for sanders, drill presses, jointers, planers, routers or shapers, CNC routers, band saws, miter saws, panel saws, radial arm saws, scroll saws, and table saws.

To further examine the relationship between teaching confidence and equipment selection considerations, simple regression analyses were conducted using perceived danger, liability, and school support as predictors of teaching confidence. Perceived danger did not significantly predict confidence in teaching the use of stationary woodworking equipment ($F(1, 81) = 2.01$, $p = .160$, $R^2 = .024$). Similarly, perceived liability did not significantly predict teaching confidence ($F(1, 81) = 3.62$, $p = .061$, $R^2 = .043$) (see Table 3.14). Although both relationships were negative, neither was statistically significant, suggesting that instructors' confidence in teaching with woodworking equipment was not meaningfully predicted by their perceptions of danger or liability.

Table 3.14. Simple regression analyses examining the relationship between confidence in teaching stationary woodworking equipment and perceived instructional concerns (n = 83)

Variable	*R*	R^2	*F*	*P*
School Support	.260	.068	5.87	.018*
Perceived Liability	*.207*	.043	3.62	.061
Perceived Danger	.156	.024	2.01	.160

Note: Dependent variable = Confidence in teaching the use of stationary woodworking equipment.
***. $p < .05$.**

School support, however, significantly predicted instructors' confidence in teaching the use of stationary woodworking equipment ($F(1, 81) = 5.87$, $p = .018$, $R^2 = .068$) (see Table 3.14). The relationship was negative because the scale ranged from fully supported to completely blocked; therefore, higher scores represented lower levels of perceived school support. This finding indicated that instructors who perceived greater school support for woodworking instruction tended to report higher levels of confidence in teaching stationary woodworking equipment. Although the amount of variance explained was relatively small, the finding suggested that school support may play a meaningful role in instructors' confidence and willingness to incorporate woodworking machinery into instruction.

A final regression analysis examined whether instructors' confidence in teaching stationary woodworking equipment predicted the extent of their safety training across equipment categories. The model was statistically significant ($F(1, 83) = 10.01$, $p = .002$, $R^2 = .108$), with teaching confidence explaining approximately 10.8% of the variance in the safety training composite (see Table 3.15). These findings suggested that instructors with higher teaching confidence also tended to report greater exposure to safety training across stationary woodworking equipment.

Table 3.15. Simple regression analysis predicting safety training exposure from confidence in teaching stationary woodworking equipment (n = 85)

Model Statistic	Value
R	.329
R^2	.108
Adjusted R^2	.097
F	10.01
Df	1, 83
P	.002

Note. Dependent variable = Safety training composite. Predictor variable = Confidence in teaching stationary woodworking equipment.

The perceptions of danger and liability did not significantly predict teaching confidence, suggesting that instructors may continue to recognize safety risks and liability concerns regardless of their confidence level. School support and safety training exposure were more closely associated with teaching confidence, indicating that instructional decision-making may be shaped not only by individual confidence but also by institutional support and prior preparation.

Research Question 4: What potential barriers (e.g., liability concerns, training level, equipment condition, facility availability, administrative restrictions) related to whether SBAE agricultural mechanics instructors choose to include or exclude specific woodworking machines in instruction?

Participants identified the contexts in which they had received safety training for stationary woodworking equipment. The most frequently reported training contexts were high school agricultural education courses (48.4%, *f* = 44), college coursework (45.1%, *f* = 41), learning from an adult outside an organization (35.2%, *f* = 32), teacher workshops (29.7%, *f* = 27), and employment outside teaching (27.5%, *f* = 25) (see Table 3.16). However, 18.7% (*f* = 17) reported never receiving safety training specifically related to stationary woodworking equipment, suggesting that limited or inconsistent safety training may represent a barrier for some instructors when deciding whether to include woodworking machinery in their instruction.

Table 3.16. Woodworking safety preparation: Teacher participation with safety training for stationary woodworking equipment (n = 91)

Variable Category	*f*	%
In high school as part of an Ag class	44	48.4
In college as part of a course	41	45.1
From an adult in the teacher’s life (parent, grandparent, etc.)	32	35.2
At a teacher workshop	27	29.7
As part of work/employment not related to teaching	25	27.5
As part of student teaching experiences related to teaching	20	22.0
Never received training on safety	17	18.7
In high school as part of a non-Ag class	14	15.4
In middle school as part of a course	10	11.0
As part of a hobby course or class	8	8.8
As part of a formal organization outside of school	1	1.1

Respondents also reported the age at which they most recently received safety training for stationary woodworking equipment. The largest proportions indicated that their most recent safety training occurred after age 22 (33.0%, *f* = 30) or between ages 19 and 22 (30.8%, *f* = 28). In contrast, 19.8% (*f* = 18) reported never receiving safety training (see Table 3.17). These findings suggested that many instructors received their most recent woodworking safety training in adulthood or during college, while a notable portion reported no safety training experience.

Table 3.17. Woodworking safety preparation: Instructor average age when received last safety training for stationary woodworking equipment (n = 91)

Variable Category	*f*	%
>22 years old (adult age)	30	33.0
19-22 years old (college age)	28	30.8
Never	18	19.8
15-18 years old (high school age)	11	12.1
12-14 years old (middle school age)	3	3.3
Under 11 years old (elementary school age)	1	1.1

Participants evaluated their agreement with the statement, “I have received enough safety training to keep my students safe when using stationary woodworking equipment.” The mean agreement was M = 4.46 (SD = 0.66), with *Mode* = 5 corresponding to strongly agree. Most respondents strongly agreed (53.8%, f = 49) or somewhat agreed (39.6%, f = 36), while fewer respondents selected neither agree nor disagree (5.5%, f = 5) or somewhat disagree (1.1%, f = 1) (see Table 3.18). Although most instructors perceived themselves as adequately prepared, neutral or negative responses indicated that perceived safety preparation may remain a barrier for a small portion of respondents.

Table 3.18. Woodworking safety preparation: Instructor perception of their safety training for stationary woodworking equipment (n = 91)

Variable Category	*F*	%
Strongly Agree	49	53.8
Somewhat Agree	36	39.6
Neither Agree nor Disagree	5	5.5
Somewhat Disagree	1	1.1
Strongly Disagree	0	0.0

Collegiate preparation was also examined as a potential pattern consistent with the implementation of woodworking machinery. The highest levels of collegiate instruction were reported for table saws (37.4%, f = 34), band saws and miter saws (36.3%, f = 33), drill presses (33.0%, f = 30), and radial arm saws (30.8%, f = 28). The lowest levels of collegiate instruction were reported for CNC routers (11.0%, f = 10), panel saws (13.2%, f = 12), and scroll saws (16.5%, f = 15) (see Table 3.4). These findings suggested that limited collegiate exposure to certain machines, particularly CNC routers and panel saws, may relate to instructors' decisions to include those machines in classroom instruction.

PLU participation was examined to determine whether ongoing professional development may serve as a support or a barrier to the implementation of woodworking. Across all 12 machines, most respondents reported attending zero PLU classes. The highest PLU participation was reported for table saws (24.2%, f = 22), attending one or more PLU experiences. The lowest participation was reported for panel saws (7.7%, f = 7) attending one or more PLU experiences (see Table 3.7). These findings suggested that limited access to woodworking-specific professional development may restrict instructors' opportunities to update technical skills and safety practices.

Respondents also evaluated program-level factors that associated with woodworking instruction, including instructional space (M = 3.62, SD = 1.46), equipment availability (M = 4.00, SD = 1.20), consumable resources (M = 4.00, SD = 1.24), school value (M = 4.14, SD = 1.05), community value (M = 4.60, SD = 0.72), and support for agricultural mechanics (M = 4.28, SD = 0.97) within Georgia pathways. These items are summarized using means, standard deviations, and agreement percentages (see Table

3.19). Program-resource variables are important because insufficient space, limited equipment, inadequate consumables, or weak institutional support may restrict woodworking instruction even when instructors possess sufficient confidence and training.

Table 3.19. Woodworking floor machines perceived instructional effectiveness: Instructor level of agreement with statements (n = 91)

Variable Category	Strongly Agree *f*	Strongly Agree %	*M*	*SD*
Agricultural mechanics should be part of the agricultural pathways in GA.	78	85.7	4.76	0.75
I value agricultural mechanics.	75	82.4	4.76	0.66
My community values agricultural mechanics.	61	67.0	4.60	0.72
My community would benefit from more agricultural mechanics being taught.	61	67.0	4.54	0.81
Using stationary woodworking equipment is part of learning agriculture.	60	65.9	4.56	0.77
Welding and wood construction should be given equal focus in agricultural mechanics.	53	58.2	4.43	0.83
Wood construction should be part of agricultural pathways in GA.	51	56.0	4.35	0.96
My teaching partners value agricultural mechanics.	47	51.6	4.28	0.97
We don’t have enough ag mech teachers coming up.	45	49.5	4.28	0.87
My program has enough equipment to teach agricultural mechanics.	41	45.1	4.00	1.20
My program has enough consumables (or budget to purchase consumables) to teach agricultural mechanics.	41	45.1	4.00	1.24
My school values agricultural mechanics.	41	45.1	4.14	1.05
My program has enough space to safely teach agricultural mechanics.	34	37.4	3.62	1.46
We don’t have enough ag teachers coming up.	15	16.5	3.16	1.23

Variable Category	Strongly Agree *f*	Strongly Agree %	*M*	*SD*
Things like welding and woodworking should be given over to construction or trades teachers.	10	11.0	1.80	1.34
We hear too much about ag mech and not enough about the rest of ag ed.	7	7.7	1.97	1.23

Finally, respondents evaluated concerns related to teaching woodworking in agricultural mechanics. The mean difficulty rating was *M* = 3.90 (*SD* = 1.08), indicating that respondents generally viewed woodworking instruction as neither easy nor difficult. The mean danger rating was *M* = 4.55 (*SD* = 1.28), suggesting that respondents perceived woodworking instruction as very dangerous and posing a meaningful safety risk. The mean liability rating was *M* = 4.77 (*SD* = 1.48), indicating a moderate liability concern. The mean school support rating was *M* = 3.02 (*SD* = 1.74), suggesting that respondents were generally somewhat supported by their schools, although responses varied (see Table 3.20).

Table 3.20. Woodworking floor machines perceived instructional effectiveness: Difficulty, danger, liability, and school support (n = 91)

Variable Category	*M*	*SD*
Liability	4.77	1.49
Danger	4.55	1.28
Difficulty	3.90	1.09
School Support	3.02	1.74

Conclusions, Implications, and Recommendations

Conclusions

The purpose of this study was to examine Georgia high school SBAE agricultural mechanics instructors' perceptions of the instructional value of stationary woodworking machinery and to identify factors influencing the inclusion or exclusion of specific woodworking machines within agricultural mechanics instruction. The findings indicated that instructors perceived stationary woodworking equipment, including miter saws, table saws, band saws, drill presses, and sanders, as the most instructionally appropriate equipment for teaching woodworking concepts, technical skills, and safety procedures. These machines were associated with the highest levels of safety training, collegiate exposure, instructional confidence, and teaching confidence, suggesting that familiarity and prior experience are strongly linked to perceptions of instructional effectiveness.

The findings further revealed that instructors rely on multiple criteria when determining whether a woodworking machine is appropriate for classroom instruction. Confidence in using and teaching equipment, perceptions of difficulty, danger, liability, and levels of school support are all associated with instructional decision-making. Although respondents generally reported high confidence in teaching the use of stationary woodworking equipment, this confidence did not eliminate perceptions of danger or liability. Instead, instructors appeared to balance the instructional value of woodworking machinery against the potential risks associated with student use. This finding supported previous agricultural mechanics safety research emphasizing that safety considerations remain central to laboratory instruction regardless of instructor experience or competence (McKim & Saucier, 2011; Saucier et al., 2014).

Confidence in using woodworking equipment explained a substantial proportion of the variation in teaching confidence, suggesting that mastery experiences remain an important component of instructional readiness. However, perceptions of danger and liability were not significant predictors of teaching confidence, indicating that even highly confident instructors continued to recognize the inherent risks associated with woodworking machinery. Institutional support and safety training experiences were more strongly associated with instructional confidence, suggesting that school support and exposure to stationary woodworking equipment played important roles in implementation decisions.

The findings also suggested that barriers to woodworking instruction extend beyond individual instructor preparation. Limited exposure to stationary woodworking machines during collegiate coursework, low participation in professional learning classes in woodworking, concerns about liability, and variations in perceived school support may be associated with instructors' decisions to include or exclude specific woodworking machines in instruction. Emerging technologies, particularly CNC routers, consistently received lower levels of training exposure and confidence ratings than stationary woodworking equipment, suggesting that adoption of advanced woodworking technologies may be constrained by limited opportunities for preparation.

Implications

Several implications emerged from these findings for SBAE agricultural mechanics instruction. First, given these self-reported patterns, stationary woodworking machinery appears to remain a valued component of agricultural mechanics education among Georgia SBAE instructors. Respondents' perceptions of the instructional value of table saws, miter saws, band saws, drill presses, and sanders suggested that these machines are viewed as useful tools for teaching measurement, problem-solving, technical skill development, and laboratory safety in experiential learning environments. This interpretation is consistent with prior literature emphasizing the role of agricultural education laboratories in supporting applied, project-based, and STEM-integrated learning experiences (Charoenmuang et al., 2024; Coleman et al., 2021; Rice & Merrick, 2023).

Second, the findings suggested that equipment implementation decisions are associated with more than just technical competence. Although confidence in operating and teaching with woodworking equipment was related to instructional readiness, respondents also identified perceived danger, liability, and school system support as considerations in determining whether the machinery was appropriate. These self-reported patterns suggested that instructors weigh both perceived instructional value and risk-related concerns when making decisions about woodworking machinery. This interpretation aligns with previous research emphasizing the complexity of agricultural mechanics laboratory supervision and safety decision-making (McKim & Saucier, 2011).

Third, respondents' lower levels of training and confidence associated with CNC routers and specialized woodworking equipment suggested that emerging technologies may be less familiar or less frequently integrated into some agricultural mechanics programs. As the industry continues to adopt digital fabrication technologies, these findings suggested a need to better understand how agricultural education instructors perceive, access, and prepare to use advanced woodworking equipment. However, the present findings should be interpreted as perceptions of training, confidence, and implementation barriers rather than evidence of actual technology adoption or student learning outcomes (Clark et al., 2021; Wells & Hainline, 2021).

Finally, the relationship between school support and instructional confidence suggested that the implementation of woodworking may be related to organizational factors beyond individual instructors' preparation. Given these self-reported patterns, resource availability, facility quality, administrative support, and community perceptions may influence instructors' perceptions of their ability to provide woodworking instruction. Therefore, these findings suggested that both instructor preparation and broader educational environments may be relevant considerations in examining the implementation of woodworking instruction (Byrd et al., 2015; McCubbins et al., 2016; McCubbins et al., 2017).

Recommendations

First, school administrators and agricultural education leaders should support woodworking instruction through investments in facilities, equipment maintenance, consumable resources, and laboratory safety infrastructure. The findings suggested that school support relates to perceived instructional confidence and may be associated with instructors' sense of preparedness to incorporate woodworking machinery into classroom instruction. Efforts to strengthen woodworking instruction should therefore include both personnel development and program resource enhancement.

Secondly, agricultural education teacher preparation programs should provide preservice teachers with opportunities to develop competence across a broad range of woodworking machinery, including both traditional equipment and emerging technologies. Coursework should emphasize machine operation, safety management, instructional strategies, and risk assessment within authentic laboratory environments.

Exposure to CNC routers and other digitally controlled technologies may be particularly important as agricultural mechanics curricula continue to evolve.

Third, state agricultural education leaders and professional development providers should expand woodworking-focused professional development opportunities. Instructor workshops should address machine operation, instructional applications, laboratory management, and safety procedures while providing hands-on experiences that strengthen instructor confidence. Particular emphasis should be placed on equipment receiving lower levels of collegiate preparation and professional development exposure, including CNC routers and specialized woodworking machinery (Clark et al., 2021; Hainline & Wells, 2024; Hubbert et al., 2001).

Next, future research should investigate the relationship between instructors' perceptions of instructional effectiveness and their actual use of woodworking machinery in agricultural mechanics laboratories. Observational studies examining equipment utilization patterns may provide a more comprehensive understanding of how instructional decisions are made in practice.

Additionally, research should examine facility characteristics, equipment inventories, administrative policies, and funding availability as they relate to decisions regarding the implementation of woodworking. Understanding how contextual factors shape instructional opportunities may help identify strategies for reducing barriers to woodworking instruction.

Finally, replication studies conducted in other states and regions would help determine whether the instructional preferences, implementation barriers, and decision-making patterns identified among Georgia SBAE agricultural mechanics instructors are consistent across broader agricultural education contexts. Such investigations could provide valuable insights for national agricultural mechanics curriculum development, teacher preparation, and professional development initiatives.

Chapter 4: The Relationship Between Confidence, Safety Preparation, and Perceived Instructional Effectiveness Among Georgia SBAE Agricultural Mechanics Instructors

Abstract

The purpose of this study was to examine the relationship between Georgia School-Based Agricultural Education (SBAE) agricultural mechanics instructors' confidence in operating stationary woodworking machinery and their confidence in teaching woodworking concepts, skills, and safety. Specifically, the study investigated whether professional development and safety training experiences were associated with *instructor confidence, whether confidence was associated with perceived instructional effectiveness, and the relationship between confidence in operating and teaching with woodworking equipment. A descriptive-correlational research design was used with responses from (N = 91) Georgia SBAE agricultural mechanics instructors. Data were analyzed using descriptive statistics, correlation analyses, and regression procedures.*

Results indicated that instructors generally reported high levels of confidence in both operating and teaching with stationary woodworking machinery. Safety training experiences emerged as a significant contributor to instructor confidence, whereas participation in collegiate coursework and professional learning opportunities had a more limited association. Instructors with greater confidence in operating woodworking machinery also reported greater confidence in teaching woodworking concepts and skills, and this confidence was positively associated with perceived instructional effectiveness. A particularly strong relationship was observed between confidence in using woodworking equipment and confidence in teaching its use.

The findings suggested that confidence plays an important role in agricultural mechanics instruction and that safety-related training experiences are associated with *the development of instructional confidence. These results underscore the importance of providing meaningful opportunities for agricultural mechanics instructors to develop technical competence and confidence through hands-on training opportunities. Such efforts may strengthen perceived instructional effectiveness and enhance woodworking instruction within SBAE programs.*

Key Words

Instructor Confidence, Perceived Instructional Effectiveness, Teaching Confidence, Operational Confidence, Safety Training, Mastery Experiences, Confidence Development, Teacher Self-Perceptions, and Agricultural Mechanics Instruction

Introduction and Review of Literature

Agricultural mechanics laboratories are complex, high-risk learning environments in school-based agricultural education (SBAE). A key component of agricultural mechanics is the use of woodworking labs with stationary floor machines such as table saws, band saws, planers, and jointers, as reflected in the Georgia Agricultural Mechanics Technology I standards, which emphasize woodworking safety, tool use, and project construction (Georgia Agricultural Education, n.d.). Teachers must help students build technical skills while also managing potential serious safety hazards (Barrick, 1989; Love, 1978; McKim & Saucier, 2011, 2013). The quality and safety of instruction in these settings depend heavily on teachers' knowledge, skills, and confidence in operating equipment and managing safety (Chumbley et al., 2018; Saucier et al., 2014).

Agricultural mechanics has long been an essential framework for experiential, project-based learning for applied STEM within SBAE (Barrick, 1989; Parr & Edwards, 2004). Woodworking projects require students to apply concepts from mathematics and science while developing skills in project layout, cutting, and assembly. Hands-on instruction in such environments can strengthen students' conceptual understanding, scientific reasoning, and content retention through kinesthetic learning (Baker & Robinson, 2016; Coleman et al., 2020, 2021; Rice & Merrick, 2023; Volk et al., 2025). Studies of agricultural literacy and STEM integration further highlight SBAE courses as important settings where youth connect classroom learning to real-world agricultural and technical systems, and parents report valuing these applied opportunities (Brune et al., 2020; Charoenmuang et al., 2024; Gawryla & Curry, 2022; Lemley et al., 2024; Miller et al., 2025).

The same authentic tools and tasks that make woodworking labs powerful also make them difficult to manage. Research has identified ongoing concerns with teacher preparation, lab management competencies, and safety practices in agricultural mechanics settings (McKim & Saucier, 2011, 2013; Saucier & McKim, 2011; Saucier et al., 2014). Many preservice and in-service SBAE teachers report lower confidence in mechanics than in other SBAE areas and express doubts about both their self-reported confidence with technical skills and their ability to supervise students safely (Blackburn et al., 2015; Burris et al., 2005; Clark et al., 2021; Whitehair et al., 2020). These patterns are associated with differences in the amount and type of mechanics coursework completed, preservice lab experiences, and access to in-service professional development (Byrd, Anderson, & Paulsen, 2015; Hainline & Wells, 2019, 2024; Wells & Hainline, 2021).

Self-efficacy, beliefs about one's ability to carry out specific tasks, shapes what instructors attempt, how much effort they invest, and how they respond to setbacks (Harder et al., 2021). In agriculture mechanics, teacher self-efficacy can be understood as confidence in operating machinery, teaching its use, and enforcing safety. Instructors with higher self-efficacy are more likely to view mechanics as a challenge, are willing to accept the challenges, develop more complex projects, and insist on improving their instruction (Granberry et al., 2022). Teachers with low confidence may avoid certain tools, techniques, or activities, thereby reducing students' exposure to vital hands-on learning (McKim & Saucier, 2011; Saucier & McKim, 2011; Tummons et al., 2017).

Recent studies showed that self-efficacy in agricultural mechanics develops through experience and support. Granberry et al. (2022) found that female undergraduates' confidence increased through meaningful shop experiences and encouragement. McKibben et al. (2022) reported that preservice teachers' self-efficacy in mechanics improved with shop exposure, while a lack of prior experience limited both confidence and interest. These findings suggest that confidence grows over time through accumulated experience and professional learning, and that this has direct implications for how teachers structure lab instruction.

Professional development (PD) is a key way for in-service agricultural mechanics instructors to build new mastery experiences and strengthen self-efficacy in woodworking operations and safety. National and regional studies consistently identify agricultural mechanics, especially lab management and safety, as a high-priority PD need (Hainline & Wells, 2019, 2024; McKim & Saucier, 2011; Toft et al., 2021; Wells & Hainline, 2021). Experiential learning, hands-on, content-specific PD can give teachers opportunities to practice with equipment, rehearse safety procedures, and receive feedback, which are conditions associated with stronger self-efficacy (Bandura, 1997). However, limited or overly theoretical PD may do little to increase confidence and may even reinforce avoidance of higher-risk woodworking activities.

Despite this, there is limited empirical work directly linking SBAE teachers' confidence in operating woodworking machinery and in safety management to their perceived instructional effectiveness and self-reported confidence. Much of the existing literature focuses on describing PD needs, general readiness in mechanics, or lab safety practices (Chumbley et al., 2018; Hainline & Wells, 2019; McKim & Saucier, 2011, 2013; Saucier & McKim, 2011; Saucier et al., 2014). However, fewer studies examine how differences in confidence translate into instructional decisions, classroom management, or student safety behaviors in agricultural mechanics, specifically in woodworking.

These issues are particularly relevant in Georgia, where SBAE programs serve diverse rural, suburban, and urban communities and students with varying prior exposure to agriculture and technical education (Ramsey et al., 2025). As equity and access in agricultural education gain attention (Lemley, Alley, & Clary, 2024; Lemley, Alley, & Morrison, 2024), it is important to understand whether differences in instructor confidence lead to unequal opportunities for students to engage in a woodworking project, develop technical skills, and practice safety behaviors. If lower-confidence instructors limit kinesthetic projects or simplify woodworking experiences, students in those programs may receive less rigorous hands-on instruction than peers whose teachers feel more prepared.

The literature has indicated that agricultural mechanics labs that teach woodworking are important, but potentially high-risk, components of SBAE programs. The SBAE teachers' confidence in mechanics varies and is shaped by prior experiences, collegiate training, and PD. Additionally, this confidence likely impacts both perceived instructional effectiveness and self-reported perceptions of confidence, though these relationships have not been thoroughly tested. This study addresses that gap by examining Georgia high school (9-12) SBAE agricultural mechanics instructors' confidence in operating and safely using woodworking machinery, and its relationship to teaching effectiveness. Specifically, the study (a) determined how participation in woodworking and agricultural mechanics PD (e.g., Professional Learning Unit (PLU) training frequency and type) predicts instructors' confidence in woodworking machinery operation and safety management; (b) examined how the SBAE agricultural mechanics instructors' confidence predicts perceived instructional effectiveness in teaching woodworking concepts and skills; (c) explored relationships between the perceived instructor confidence in woodworking safety practices and perceived self-reported confidence (safety, behavior, skill attainment, and successful project completion); and (d) described the instructors' self-reported confidence, how confidence or lack of confidence impacts perceived instructional delivery, classroom/lab management, and safety enforcement during woodworking instruction.

Theoretical Framework

This study was guided conceptually by Bandura's (1997) self-efficacy theory, which explains how people's beliefs about what they can do affect what they try, how hard they work, and how they respond to difficulties (Harder et al., 2021). Self-efficacy is task and context-specific, not a general sense of confidence. In this article, instructor self-efficacy is defined as Georgia SBAE agricultural mechanics instructors' confidence in their areas of woodworking instruction: (a) safely and competently operating stationary woodworking machines (e.g., table saws, band saws, planers, jointers, drill presses); (b) teaching woodworking concepts and skills with those machines (e.g., measurement, layout, cutting, surfacing, joinery); (c) and managing safety instruction in the agricultural mechanics woodworking labs (e.g., enforcing rules, supervising machine use, responding to hazards). Research has shown many preservice and in-service SBAE teachers feel less confident in mechanics than in other parts of the agricultural education curriculum, which can lead to anxiety and avoidance of potential higher-risk agricultural mechanics lab activities (Blackburn et al., 2015; Burris et al., 2005; Clark et al., 2021; McKim & Saucier, 2011; Saucier & McKim, 2011; Tummons et al., 2017; Whitehair et al., 2020). In contrast, teachers with higher agricultural mechanics self-efficacy tend to see lab work as a challenge they are willing to "take on" and are more likely to provide rich, experiential learning experiences (Granberry et al., 2022, p. 56).

The study was informed by Bandura's (1997) self-efficacy theory. Specifically, questionnaire items addressing safety training experiences, woodworking preparation, and confidence in using and teaching woodworking machinery were conceptually aligned with the theory's emphasis on mastery experiences and efficacy beliefs. However, the study did not directly measure all components of self-efficacy theory, such as vicarious experiences, social persuasion, or physiological and emotional states. Therefore, Bandura's (1997) framework was used primarily as a lens for interpreting relationships among training experiences, confidence, and instructional practices rather than as a fully operationalized theoretical model.

Within this framework, professional development is a key context in which all four sources of self-efficacy can be activated. Needs assessments repeatedly identify agricultural mechanics, especially agricultural mechanics lab management and safety, as a high-priority PD area (Hainline & Wells, 2019, 2024; McKim & Saucier, 2011; Toft et al., 2021; Wells & Hainline, 2021). Hands-on, context-specific PD can provide mastery experiences with woodworking equipment and safety procedures, allow teachers to observe more expert peers, offer constructive feedback and encouragement, and help teachers manage anxiety and gain comfort while teaching woodworking. McKibben et al. (2022) similarly demonstrated that authentic agricultural mechanics experiences were associated with stronger perceptions of self-efficacy among preservice teachers, providing additional support for Bandura's (1997) emphasis on mastery experiences. Bandura's (1997) work has also suggested that once teachers are engaged in instruction, higher self-efficacy should be linked to better performance. McKibben et al. (2023) likewise suggested that instructors' efficacy beliefs are associated with pedagogical approaches used during agricultural mechanics instruction, providing additional context for examining perceived instructional effectiveness. In woodworking, more confident instructors are expected to see themselves as more effective instructors: they design more rigorous student projects, use conceptually rich labs, utilize a variety of machines for mastery, persist in helping students master more complex and diverse tasks, and consistently enforce strong safety practices (Baker & Robinson, 2016; Chumbley et al., 2018; Coleman et al., 2020, 2021; McKim & Saucier, 2013; Rice & Merrick, 2023; Saucier & McKim, 2011; Saucier et al., 2014). Lower-confidence instructors are more likely to simplify woodworking activities, avoid certain machines, or tolerate less strict adherence to safety rules, which can limit student skill development and increase risky student behaviors.

The study treats professional development participation (frequency and type of woodwork/agricultural mechanics training) as an upstream factor that creates opportunities for developing efficacy experiences; instructor confidence in woodworking machinery operation and safety management as the central self-efficacy construct; and perceived instructional effectiveness and perceived self-reported confidence (safety behavior, skill attainment, successful project completion) as outcomes expected to be positively related to self-efficacy. Quantitative data on how SBAE agricultural mechanics instructors self-report confidence, or lack thereof, shape their instructional delivery, classroom management styles, and safety enforcement, which are used to explain how these efficacy beliefs operate in daily practice in agricultural mechanics labs (Bandura, 1997; Wolf et al., 2010; McKibben et al., 2022). Together, this framework explains how PD experiences can shape teachers' confidence in woodworking and how that confidence, in turn, relates to their perceived effectiveness and self-reported confidence in the Georgia SBAE agricultural mechanics programs.

Purpose and Objectives

The purpose of this study was to examine the relationships among professional development participation, instructional confidence in woodworking machinery operation and safety management, perceived instructional effectiveness, and self-reported confidence in Georgia high school (grades 9-12) SBAE agricultural mechanics programs. Grounded in Bandura's (1997) self-efficacy theory, the study focused on how

efficacy-building experiences, particularly professional development, relate to instructors’ confidence in managing woodworking laboratories, and how that confidence is associated with their teaching safety and skill confidence in woodworking.
The specific objectives of the study were to

1. Determine the extent to which professional development participation (e.g., PLU training frequency and type) predicts Georgia SBAE agricultural mechanics instructors’ confidence in woodworking floor machinery operation and safety management.

2. Examine the extent to which SBAE agricultural mechanics instructors' confidence in woodworking machinery operation and safety predicts perceived instructional effectiveness in teaching woodworking concepts and skills.

3. Assess the relationship between SBAE agricultural mechanics instructors’ confidence levels in safety practices when teaching versus when using woodworking machinery.

Methods

This study employed a quantitative, nonexperimental research design using descriptive and correlational survey methods to examine relationships among professional development participation, woodworking machinery confidence, safety confidence, and perceived instructional effectiveness among Georgia high school SBAE agricultural mechanics instructors (Creswell & Creswell, 2018; Fraenkel et al., 2019). A survey approach was appropriate because the study sought to collect information regarding instructors’ prior training experiences, confidence levels, perceptions of instructional effectiveness, and safety-related teaching practices without manipulating variables or introducing experimental treatments.

The descriptive component of the study summarized the instructors' levels of confidence in operating stationary woodworking machinery, teaching woodworking safety, and participating in woodworking-related professional development activities, as well as their perceptions of instructional effectiveness. The correlational component was designed to examine relationships among these variables and determine the extent to which professional development and confidence measures predicted perceived instructional effectiveness.

Bandura's (1997) framework was used primarily as a lens for interpreting relationships among training experiences, confidence, and instructional practices rather than as a fully operationalized theoretical model. Within this framework, confidence in operating woodworking machinery and managing woodworking safety was viewed as a form of task-specific self-efficacy that may be associated with instructional behaviors and perceptions of effectiveness. The study examined whether experiences associated with the development of self-efficacy, including professional learning, safety training, and prior woodworking experience, were related to instructors' confidence and perceived instructional effectiveness.

Participants

The population for this study consisted of Georgia high school (grades 9-12) SBAE instructors who taught agricultural mechanics courses during the 2025-2026 academic year and incorporated woodworking-related instruction within their programs. Participants were identified through records maintained by the Georgia Agricultural Education Department and were required to have current teaching responsibilities in agricultural mechanics. The original listing included 145 instructors associated with agricultural mechanics instruction.

A census approach was used, whereby all instructors who met the established criteria were invited to participate in the study (Creswell & Creswell, 2018). Data were collected electronically using Qualtrics during the spring semester of the 2025-2026 academic year. Multiple contact attempts, including an initial invitation and subsequent reminder messages, were employed to encourage participation and maximize response rates. Five individuals were removed because they were no longer employed in teaching positions during Spring 2026, and the researcher was removed from the list to prevent self-participation and reduce potential bias. Prior to analysis, responses were screened for eligibility and completeness.

During the data collection period, 106 agricultural education instructors initiated the questionnaire. One respondent elected not to participate in the study and was removed from further consideration. Completed questionnaires were subsequently reviewed for eligibility and completeness. Because the primary analyses relied on responses to items assessing woodworking confidence, safety preparation, participation in professional development, and perceived instructional effectiveness, questionnaires with substantial missing data were excluded. Specifically, respondents who completed less than 50% of the survey instrument were removed from the dataset, as incomplete responses provided insufficient information for meaningful analysis.

Following the screening process, responses (*N* = 91) were retained for statistical analysis, yielding a usable response rate of 85.8%. The final sample included SBAE agricultural mechanics instructors representing a range of school settings, teaching experiences, certification backgrounds, and program enrollments across Georgia. As such, the respondent group provided an appropriate representation of instructors engaged in woodworking instruction and served as the basis for examining relationships among professional development experiences, woodworking confidence, safety confidence, and perceived instructional effectiveness.

To assess the possibility of nonresponse error, early and late respondents were compared using procedures recommended by Lindner et al. (2001) and further described by Lindner (2002). Respondents who submitted questionnaires during the first 25 days of the collection period were classified as early respondents, whereas those who responded during the final 25 days were classified as late respondents. Independent-samples *t*-tests were conducted to compare the groups on selected study variables, including woodworking knowledge, confidence in operating woodworking equipment, perceptions of the adequacy of safety training, and self-reported woodworking expertise. No statistically significant differences were detected between early and late respondents on any of the variables examined ($p > .05$). These findings suggested that nonresponse error was unlikely to have substantially associated with the results and provide evidence that the respondent sample was reasonably representative of the accessible population.

Participant Characteristics

Participants' ($N = 91$) personal and professional characteristics were examined to provide context for interpreting the study findings. Respondents represented a diverse range of ages, years of teaching experience, school settings, certification pathways, and agricultural mechanics program sizes. The majority of participants taught primarily at the high school level (89.0%, *f* = 81) and were employed in rural (65.9%, *f* = 60) or town (20.9%, *f* = 19) school systems, reflecting the demographic composition commonly associated with agricultural education programs throughout Georgia.

Teaching experience among respondents ranged from beginning teachers with 0 to 5 years of experience (15.4%, *f* = 14) to veteran educators (3.3%, *f* = 3) with more than 3 decades of classroom experience. Participants also represented multiple certification pathways, such as undergraduate (76.9%, *f* = 70) and graduate (7.7%, *f* = 7) programs. Also, prior educational backgrounds teaching in middle and high school (95.6%, *f* = 87), providing perspectives from instructors with varying levels of formal preparation and professional experience (see Table 4.1). Agricultural mechanics program enrollment varied considerably among respondents, indicating that the study included instructors working in both small and large agricultural education programs.

The participant characteristics suggest that the sample reflected a broad cross-section of Georgia SBAE agricultural mechanics instructors responsible for delivering woodworking instruction. The diversity of the respondent group provided a comprehensive perspective on professional development experiences, confidence in operating and using woodworking machinery safely, and perceptions of instructional effectiveness within SBAE agricultural mechanics programs.

Table 4.1. Participant characteristics (n = 91)

Characteristics Variables	*f*	%
Gender		
Male	77	84.6
Female	13	14.3
Did Not Answer	1	1.1
Community		
Rural	60	65.9
Town	19	20.9

Characteristics Variables	*f*	%
Suburban	11	12.1
Did Not Answer	1	1.1
Age		
40-49	27	29.7
30-39	26	28.6
20-29	17	18.7
50-59	16	17.6
60-69	3	3.3
Did Not Answer	2	2.2
Years of SBAE Teaching Experience		
11-15	21	23.1
6-10	20	22.0
0-5	14	15.4
21-25	12	13.2
16-20	11	12.1
26-30	8	8.8
31 and Greater	3	3.3
Did Not Answer	2	2.2
Current Teaching Level		
High School (9-12 Grades)	81	89
Georgia State Staff	4	4.4
Both Middle and High School (6-12 Grades)	3	3.3
Middle School (6-8 Grades)	2	2.2
Did Not Answer	1	1.1
Grade Levels of Ag Education Taught		
High School (9-12 grades)	52	57.1
Both Middle (6-8 grades) and High School (9-12 grades)	35	38.5
Other	3	3.3
Path to Initial Certification		
Student Taught as an Undergraduate	70	76.9
Did not Student Teach	10	11.0
Student Taught as a Graduate	7	7.7
Student Taught as a Certification Program Non-Degree	3	3.3
Did Not Answer	1	1.1
Student Teaching Experience		
Student Teaching in Ag Education	74	81.3
No Student Teaching Experience	11	12.1
Student Teaching in Other Areas of Education	6	6.6

Instrumentation and Data Analysis

Data were collected using a researcher-developed electronic questionnaire designed to assess woodworking-related preparation, participation in professional development, operational confidence, safety confidence, and perceived instructional effectiveness. Instrument development was guided by an extensive review of literature related to agricultural mechanics education, teacher self-efficacy, laboratory safety, professional development, and technical skill instruction (Bandura, 1997; Blackburn et al., 2015; Clark et al., 2021; Granberry et al., 2022; Hainline & Wells, 2024; McKim & Saucier, 2011).

The questionnaire included multiple response formats, including Likert-type scales, matrix questions, categorical response items, and checklist questions. Respondents provided information on participation in Professional Learning Unit (PLU) workshops, prior woodworking safety training experiences, confidence in personally operating stationary woodworking machinery, confidence in teaching students to safely operate woodworking machinery, and perceptions of instructional effectiveness when teaching woodworking concepts and skills.

The stationary woodworking equipment examined in this study included sanders, drill presses, jointers, planers, routers or shapers, computer numerical control (CNC) routers, band saws, miter saws, panel saws, radial arm saws, scroll saws, and table saws. These machines were selected because they appear on Georgia Agricultural Education equipment recommendations and represent woodworking equipment commonly used within agricultural mechanics laboratories.

Professional Development Participation

Professional development participation was operationalized through respondents' reported attendance at PLU activities and other woodworking-related training experiences. Participants indicated the number of professional development experiences completed for each woodworking machine category. Descriptive statistics were used to summarize participation patterns, and composite professional development variables were created for use in predictive analyses.

Confidence in Woodworking Operation and Safety

Respondents evaluated their confidence in personally operating and in teaching students to safely operate woodworking machinery using 5-point Likert-type scales ranging from not confident to confident. Composite confidence scores were calculated to represent overall confidence in woodworking operations and in teaching safety practices. These measures served as primary variables for examining relationships among self-efficacy, safety practices, and perceived instructional effectiveness.

Perceived Instructional Effectiveness. Perceived instructional effectiveness was measured through respondents' evaluations of their ability to teach woodworking concepts, technical skills, and safety procedures using stationary woodworking machinery. Composite measures were developed where appropriate to represent overall perceptions of instructional effectiveness. These variables served as dependent measures to examine patterns consistent with participation in professional development and woodworking-related confidence.

Validity

Content validity was established through an extensive review of the literature on agricultural mechanics instruction, woodworking safety, teacher preparation, self-efficacy, and professional development. Instrument items were evaluated by a group of identified experts. The experts were professionals, each possessing decades of expertise in agricultural education, agricultural mechanics instruction, stationary woodworking tool use, stationary woodworking tool instruction, general laboratory safety, laboratory management, and educational research. The experts evaluated the instrument for face and content validity. Feedback was used to improve item clarity, strengthen alignment with the study objectives, and ensure relevance to contemporary agricultural mechanics instruction.

The literature review and expert review processes provided evidence supporting the instrument's face and content validity. However, no empirical procedures were conducted to establish construct validity mathematically. Specifically, exploratory factor analysis, confirmatory factor analysis, or other statistical procedures commonly used to validate constructs were not performed. Therefore, the variables and composite measures included in this study should be interpreted as operationalized representations developed to address the research objectives rather than as empirically validated constructs.

Reliability

Internal consistency reliability was evaluated using Cronbach’s alpha coefficient (Clemons & Lindner, 2025). Reliability analyses were conducted on scaled questionnaire items related to woodworking confidence, safety confidence, professional development experiences, and perceived instructional effectiveness. Reliability coefficients were interpreted using guidelines established by George and Mallery (2020), with coefficients equal to or greater than .70 are considered acceptable for research purposes. The resulting reliability estimates ($\alpha = .944$, $N = 94$) provided evidence that the instrument produced consistent measurements suitable for examining relationships among the variables included in this investigation.

Data Analysis

The data was analyzed using IBM SPSS Statistics. Descriptive statistics, including frequencies, percentages, means, standard deviations, medians, and modes, were calculated to summarize participant characteristics, professional development experiences, confidence levels, and perceptions of instructional effectiveness.

The first research question examined the extent to which participation in professional development predicted confidence in woodworking operations and safety management. Correlation analyses and multiple regression procedures were used to determine relationships between professional development experiences and confidence measures.

The second research question examined the extent to which instructors' confidence in woodworking operation and safety predicted perceived instructional effectiveness. Pearson product-moment correlations and regression analyses were employed to evaluate predictive relationships among confidence variables and perceived instructional effectiveness measures. Where assumptions of normality were violated, appropriate nonparametric procedures were utilized.

The third research question examined the relationship between confidence in safely using woodworking machinery and confidence in teaching woodworking safety. Correlation analyses were conducted to determine the strength and direction of associations between personal-use confidence and teaching-related safety confidence. Correlation coefficients were interpreted using Cohen’s (1988) guidelines for effect size interpretation.

Findings

Research Question 1: To what extent does professional development participation (e.g., PLU training frequency and type) predict SBAE agricultural mechanics instructors’ confidence in woodworking machinery operation and safety management?

To examine the extent to which participation in professional development predicted SBAE agricultural mechanics instructors' confidence in operating and managing woodworking machinery, a series of correlational and multiple regression analyses was conducted. Three predictor variables were included in the analysis: participation in PLU training related to woodworking equipment, participation in woodworking safety training experiences, and collegiate coursework involving woodworking machinery. Two dependent variables were examined separately: confidence in personally using stationary woodworking equipment and in teaching students to use it.

Confidence in Teaching Woodworking Equipment

Pearson correlation analyses were first conducted to examine relationships among the study variables. Confidence in teaching stationary woodworking equipment was positively associated with participation in woodworking safety training (r = .29, p

= .004) and collegiate woodworking coursework (r = .23, p = .020). However, participation in PLU training was not significantly associated with confidence in teaching woodworking equipment (r = .13, p = .120) (see Table 4.2).

Table 4.2. Pearson correlations among professional development variables and confidence measures

Variables	1	2	3	4	5
Confidence Teaching	-				
Confidence Using	.935***	-			
Safety Training Composite	.290**	.357***	-		
Collegiate Coursework Composite	.226*	.159	.409***	-	
PLU Training Composite	.130	.154	.272	.447***	-

Note. p < .05*, p < .01, p < .001*****

To determine the combined predictive association with professional development experiences, a multiple linear regression analysis was conducted with confidence in teaching woodworking equipment as the dependent variable. The overall regression model was statistically significant (F(3, 79) = 2.93, p = .038, R^2 = .100), indicating that the predictor variables explained a significant proportion of variation in teaching confidence. The model accounted for approximately 10.0% of the variance in confidence in teaching woodworking equipment.

Examination of the individual predictors revealed that participation in woodworking safety training was the only statistically significant predictor of confidence in teaching woodworking equipment (β = .24, t(3, 79) = 2.06, p = .043). Neither PLU participation (β = < -.01, t(3, 79) = -0.03, p = .976) nor collegiate woodworking coursework (β = .14, t(3, 79) = 1.11, p = .271) was significantly related to the model after controlling for the other variables (see Table 4.3), suggesting that instructors who participated in more woodworking safety training tended to report higher confidence in teaching students to use stationary woodworking equipment safely and effectively. Conversely, PLU participation and collegiate coursework alone did not significantly predict teaching confidence when considered alongside broader safety training experiences.

Table 4.3. Multiple regression predicting confidence in teaching woodworking equipment

Variables	*b*	*SE*	β	*t*	*p*
Safety Training Composite	0.50	0.24	.24	2.06	.043*
PLU Training Composite	< -0.01	0.15	< -.01	-0.03	.976
Collegiate Coursework Composite	0.30	0.27	.14	1.11	.271

Note. $p < .05$*
($R^2 = .07$, $F(3,79) = 2.93$, $p = .038$, $R^2 = .100$), Adjusted $R^2 = .066$

Confidence in Using Woodworking Equipment

A second set of analyses examined instructors' confidence in personally using stationary woodworking equipment. Pearson correlations indicated that confidence in using woodworking equipment was positively associated with participation in woodworking safety training ($r = .36$, $p < .001$). Neither PLU participation ($r = .15$, $p = .079$) nor collegiate coursework ($r = .16$, $p = .073$) showed a statistically significant relationship with confidence in equipment use.

A multiple linear regression analysis was conducted with confidence in using woodworking equipment as the dependent variable. Results indicated that the overall model was statistically significant ($F(3, 81) = 4.08$, $p = .009$, $R^2 = .131$). The model explained approximately 13.1% of the variance in confidence in using woodworking equipment.

Among the predictor variables, participation in woodworking safety training emerged as the only significant predictor of confidence in equipment use (β = .34, *t*(3,

81) = 3.01, p = .003). Neither PLU participation (β = .07, t(3, 81) = 0.56, p = .576) nor collegiate coursework (β = -.01, t(3, 81) = -0.09, p = .931) significantly predicted confidence in equipment use (see Table 4.4).

Table 4.4. Multiple regression predicting confidence in using woodworking equipment

Variables	*b*	*SE*	β	*t*	*p*
Safety Training Composite	0.66	0.22	.34	3.01	.003**
PLU Training Composite	0.07	0.13	.07	0.56	.576
Collegiate Coursework Composite	-0.02	0.24	-.01	-0.09	.931

Note. $p < .01$**
(F(3,81) = 4.08, p = .009, R^2 = .131), Adjusted R^2 = .099

Additional correlational analyses supported these findings. A Spearman's rank-order correlation revealed a moderate positive relationship between woodworking safety training experiences and confidence in using woodworking equipment (r_s(87) = .44, p < .001). Similarly, woodworking safety training demonstrated a moderate positive relationship with confidence in teaching woodworking equipment (r_s(85) = .34, p = .001). In contrast, PLU participation was not significantly associated with either confidence in teaching woodworking equipment (r_s(86) = .17, p = .115) or confidence in using woodworking equipment (r_s(88) = .19, p = .070).

Research Question 2: To what extent does the SBAE agricultural mechanics instructor's confidence in woodworking machinery operation and safety predict perceived instructional effectiveness in teaching woodworking concepts and skills?

Research question two was examined by a Pearson correlation analysis, and multiple linear regression procedures were conducted to examine the relationships among the instructors' confidence in using woodworking machinery, confidence in teaching woodworking machinery, perceptions of safety training adequacy, and perceived instructional effectiveness.

Descriptive statistics indicated that respondents reported relatively high levels of confidence in using woodworking machinery (*M* = 4.36, *SD* = 0.69), in teaching woodworking machinery (*M* = 4.28, *SD* = 0.73), and in the perceived adequacy of safety training (*M* = 4.48, *SD* = 0.62). Respondents also reported generally positive perceptions of instructional effectiveness (*M* = 3.93, *SD* = 0.59).

Pearson correlation analyses revealed statistically significant positive relationships between perceived instructional effectiveness and both confidence variables. Confidence in using woodworking machinery was moderately correlated with perceived instructional effectiveness ($r = .335$, $p = .001$), indicating that instructors who reported higher confidence in operating woodworking equipment also tended to report greater perceived instructional effectiveness. Similarly, confidence in teaching woodworking machinery demonstrated a positive relationship with perceived instructional effectiveness ($r = .293$, $p = .004$) (see Table 4.5).

Table 4.5. Correlations among confidence variables, safety training adequacy, and perceived instructional effectiveness (N = 80)

Variables	1	2	3	4
Perceived Instructional Effectiveness	-			
Confidence Using	.335**	-		
Confidence Teaching	.293**	.927**	-	
Safety Training Composite	-.009	.417**	.411**	-

Note. ***p* < .01****

In contrast, perceptions regarding the adequacy of safety training were not significantly related to perceived instructional effectiveness. Pearson correlation analyses indicated virtually no relationship between perceived safety training adequacy and perceived instructional effectiveness (r = -.001, p = .992*). These findings suggested that instructors' perceptions of having received sufficient safety training were not associated with their perceptions of instructional effectiveness.

To further examine the predictive value of confidence and safety perceptions, a multiple linear regression analysis was conducted with perceived instructional effectiveness as the dependent variable and confidence in using woodworking machinery, confidence in teaching woodworking machinery, and perceived adequacy of safety training as predictor variables. The overall regression model was statistically significant ($F(3, 76) = 4.14$, $p = .009$, $R^2 = .140$), explaining approximately 14.0% of the variance in perceived instructional effectiveness.

Although the overall model was significant, none of the individual predictors demonstrated statistically significant unique contributions after controlling for the effects of the other variables. Confidence in using woodworking machinery approached significance ($\beta = .50$, $t(3, 76) = 1.74$, $p = .086$), while confidence in teaching woodworking machinery ($\beta = -.09$, $t(3, 76) = -0.33$, $p = .744$) and perceived safety training adequacy ($\beta = -.18$, $t(3, 76) = -1.51$, $p = .135$), were not significant predictors (see Table 4.6). Examination of the correlation matrix revealed a very strong relationship between confidence in using and confidence in teaching woodworking machinery ($r = .93$, $p < .001$), indicating substantial overlap between the two constructs. These likely represent a shared underlying dimension of self-efficacy.

Table 4.6. Multiple regression predicting perceived instructional effectiveness

Variables	*b*	*SE*	β	*t*	*p*
Confidence Using	0.42	0.24	.50	1.74	.086
Confidence Teaching	-0.08	0.23	-.10	-0.33	.744
Safety Training Composite	-0.17	0.11	-.18	-1.51	.135

Note. (*F*(3, 76) = 4.14, *p* = .009, R^2 = .140), Adjusted R^2 = .106

Research Question 3: What is the relationship between the SBAE agricultural mechanics instructors' confidence levels in safety practices when teaching versus when using woodworking machinery?

Research question three sought to determine the relationship between SBAE agricultural mechanics instructors' confidence levels when personally using stationary woodworking equipment and their confidence levels when teaching students to use the same equipment. Composite variables were created for confidence in using and in teaching woodworking machinery based on instructors' responses across 12 categories of stationary woodworking equipment.

Descriptive statistics indicated that respondents reported relatively high levels of confidence for both constructs. The mean confidence score for using woodworking machinery was *M* = 4.35, *SD* = 0.73, while the mean confidence score for teaching woodworking machinery was (*M* = 4.25, *SD* = 0.79) (see Table 4.7). These findings suggested that most instructors perceived themselves as confident in both operating woodworking equipment and teaching students to use it safely and effectively.

Table 4.7. Descriptive statistics for confidence variables

Variable	*n*	*M*	*SD*
Confidence Using Composite	89	4.35	0.73
Confidence Teaching Composite	87	4.25	0.79

A Pearson correlation was conducted to examine the relationship between the two confidence measures. Results revealed a strong positive relationship between confidence in using woodworking machinery and confidence in teaching woodworking machinery (*r* = .94, *p* < .001). These likely represent a shared underlying dimension of self-efficacy. Also, to further examine the predictive relationship between the two variables, a simple linear regression analysis was conducted with confidence in teaching woodworking machinery as the dependent variable and confidence in using woodworking machinery as the independent variable. The regression model was statistically significant ($F(1, 84) = 585.16$, $p < .001$, $R^2 = .874$), explaining 87.4% of the variance in confidence for teaching woodworking equipment. Confidence in using woodworking machinery was a significant positive predictor of confidence in teaching woodworking machinery ($\beta = .94$, $t(1, 84) = 24.19$, $p < .001$) (see Table 4.8). The strength of the relationship suggests that personal operational confidence and instructional confidence are closely aligned constructs among Georgia SBAE agricultural mechanics instructors.

Table 4.8. Simple linear regression predicting confidence teaching from confidence using

Variables	*b*	*SE*	Β	*t*	*p*
Confidence Using Composite	1.01	0.04	.94	24.19	< .001

Note. (F(1, 84) = 585.16, p < .001, R^2 = .874), Adjusted R^2 = .873

Conclusions, Implications, and Recommendations

Conclusions

The purpose of this study was to examine how Georgia SBAE agricultural mechanics instructors' confidence in operating and safely using stationary woodworking machinery related to their confidence in teaching woodworking concepts, skills, and safety. Specifically, the study investigated whether professional development experiences predicted confidence in operating and managing woodworking machinery, whether confidence predicted perceived instructional effectiveness, and the relationship between confidence in using and in teaching stationary woodworking equipment. These findings align with McKibben et al. (2022), who observed that repeated opportunities to engage in authentic agricultural mechanics experiences were associated with higher perceptions of technical confidence among preservice agricultural educators.

The findings indicated that woodworking safety training experiences were significant contributors to the instructors' confidence in both operating and teaching stationary woodworking machinery. However, participation in PLU courses and collegiate woodworking coursework demonstrated limited predictive value when considered alongside other training experiences. These findings suggested that confidence development may be less associated with the training setting and more with opportunities to engage in meaningful, safety-oriented experiences with woodworking equipment.

Confidence in using woodworking machinery emerged as one of the strongest predictors of confidence in teaching woodworking equipment, explaining 87.4% of the variation in instructional confidence. This finding suggested that instructors' perceptions of their technical capabilities are closely linked to their willingness and readiness to facilitate student learning experiences with stationary woodworking machinery.

The findings further revealed that confidence in using and teaching woodworking machinery was positively associated with perceived instructional effectiveness. Although the present study examined instructors' perceptions rather than objective instructional performance, these findings are consistent with McKibben et al. (2023), who reported relationships between efficacy beliefs and pedagogical approaches in agricultural mechanics. Instructors who reported greater confidence in their woodworking abilities were more likely to perceive their agricultural mechanics programs as effective environments for teaching woodworking concepts and skills. However, perceptions of having received sufficient safety training were not independently associated with perceived instructional effectiveness, suggesting that confidence itself may be a more influential factor in shaping instructional perceptions than training adequacy alone.

Finally, a strong positive relationship existed between confidence in using woodworking machinery and confidence in teaching woodworking machinery. The extremely strong correlation between confidence in using woodworking machinery and confidence in teaching woodworking machinery (r = .935, p < .001) suggested that these measures may represent a shared underlying dimension of woodworking self-efficacy rather than wholly independent constructs. These findings suggested that instructional confidence and operational confidence are closely interconnected constructs among SBAE agricultural mechanics instructors' self-reported confidence with woodworking machinery. Therefore, the two constructs should be interpreted as highly related dimensions of woodworking self-efficacy rather than entirely distinct forms of confidence. These findings also complement Clemons et al. (2018), who identified substantial variation in agricultural mechanics expertise among practicing teachers, suggesting that confidence and perceived competence are closely intertwined across agricultural mechanics content areas.

Implications

The findings suggested that confidence plays an important role in agricultural mechanics instruction involving stationary woodworking machinery. Given these self-reported patterns, the strong relationship between confidence in equipment operation and confidence in teaching suggested that experiences providing opportunities for instructors to develop familiarity and competence with woodworking equipment may also contribute to greater perceived instructional confidence. This finding is consistent with Bandura's (1997) assertion that mastery experiences contribute to the development of efficacy beliefs.

The results further suggested that professional learning experiences involving woodworking safety and machine operation may be associated with higher levels of instructional confidence. Given these self-reported patterns, agricultural education stakeholders may wish to consider the extent to which professional development opportunities provide instructors with hands-on experiences alongside theoretical knowledge. Such opportunities may support the development of both technical competence and confidence related to woodworking instruction.

Additionally, the positive relationships observed between confidence and perceived instructional effectiveness suggested that instructors who reported higher confidence tended to report more favorable perceptions of their instructional effectiveness. These findings did not demonstrate actual improvements in instruction or student learning; however, they suggested that confidence may be an important factor influencing how instructors perceive their ability to teach woodworking concepts and skills. Consequently, efforts to support woodworking education may benefit from considering the development of confidence alongside the acquisition of technical skills.

Recommendations

First, agricultural education teacher preparation programs should incorporate structured opportunities for preservice teachers to develop confidence operating and teaching with stationary woodworking machinery. Laboratory experiences should provide repeated practice with equipment operation, safety management, and instructional demonstrations to promote mastery experiences that strengthen self-efficacy (Bandura, 1997).

Second, state agricultural education leaders and professional development providers should design woodworking-focused training experiences that emphasize hands-on participation and the application of safety practices. Because safety training experiences demonstrated the strongest relationships with confidence outcomes, professional learning opportunities should provide practical engagement with woodworking equipment rather than relying exclusively on informational delivery.

Third, local school systems and agricultural education programs should encourage continued skill development among instructors by providing access to woodworking laboratories, equipment, and specialized training opportunities. Sustained engagement with woodworking machinery may help maintain operational competence and instructional confidence over time.

Finally, future research should investigate how confidence develops throughout an instructor's career and identify the specific experiences that most strongly relate to its formation. Longitudinal studies examining changes in confidence across preservice preparation, early-career teaching, and experienced practice could provide valuable insights for improving agricultural mechanics teacher development. Additional research should also explore whether increases in instructor confidence translate into measurable differences in skill acquisition and laboratory safety performance.

Chapter 5: Epilogue

This dissertation suggests that woodworking instruction remains an important component of agricultural mechanics education in Georgia. Across all three studies, safety preparation, mastery experiences, and instructor confidence emerged as central factors influencing woodworking instruction. Strengthening these areas may enhance perceived instructional effectiveness, expand student learning opportunities, and support the continued integration of woodworking within contemporary SBAE agricultural mechanics programs.

Summary of Findings by Study

Article 1: Development of Woodworking Knowledge, Skills, and Safety Preparation

The first study examined how Georgia SBAE agricultural mechanics instructors developed knowledge and skills in stationary woodworking machinery, how those experiences were associated with confidence, and how instructors perceived woodworking safety preparation.

Major findings included

- Respondents reported multiple pathways for developing woodworking knowledge and skills, with the most common experiences occurring through high school agricultural education coursework, collegiate agricultural mechanics instruction, personal experiences, and professional development activities.
- High school agricultural education courses were among the most frequently reported sources of woodworking safety training, suggesting that many

instructors had developed foundational woodworking knowledge prior to entering teacher preparation programs.

- Participants generally reported high levels of confidence in both using and teaching the operation of woodworking machinery.
- Instructors overwhelmingly indicated that they had received sufficient safety training to safely supervise students operating stationary woodworking equipment.
- A strong positive relationship existed between instructors’ confidence in using woodworking machinery and their confidence in teaching woodworking machinery.
- Confidence in teaching woodworking equipment was strongly associated with confidence in personally operating woodworking equipment, indicating that mastery experiences and technical competence related to instructional confidence.
- Safety training experiences appeared to play a substantial role in developing confidence and preparedness in woodworking.
- Participant characteristics such as age, years of teaching experience, school setting, and program size showed relatively weak relationships with woodworking confidence compared with training and safety preparation experiences.

Research Question 1: What are the primary contexts through which Georgia agricultural mechanics instructors report developing woodworking machinery skills and knowledge?

The findings indicated that woodworking knowledge and safety preparation were acquired through multiple formal and informal experiences. The largest proportions of respondents reported receiving woodworking safety training through high school agricultural education courses (48.4%, *f* = 44), collegiate coursework (45.1%, *f* = 41), and learning experiences from adults outside formal organizations (35.2%, *f* = 32). Teacher workshops (29.7%, *f* = 27) and work experiences outside of education (27.5%, *f* = 25) were also common sources of training. Some respondents reported never having received formal safety training related to stationary woodworking equipment (18.7%, *f* = 17).

Respondents further reported that their most recent woodworking safety training typically occurred during adulthood (33.0%) or during college (30.8%), suggesting that many instructors continued to develop woodworking competencies after entering the profession. These findings demonstrated that the development of woodworking knowledge occurs through a combination of agricultural education, postsecondary instruction, professional experiences, and informal learning opportunities.

Research Question 2: How do SBAE agricultural mechanics instructors perceive these developmental contexts in contributing to their confidence in teaching and using woodworking machinery?

Participants generally reported high levels of confidence in both operating and teaching the operation of stationary woodworking equipment. The highest confidence ratings were associated with commonly used equipment such as miter saws, drill presses, sanders, and table saws, while lower confidence ratings were reported for CNC routers, panel saws, and radial arm saws.

Correlation analyses revealed a statistically significant and exceptionally strong relationship between confidence in using woodworking machinery and confidence in teaching woodworking machinery. Spearman's rho indicated a strong positive relationship ($\rho = .884$, $p < .001$), while Pearson's correlation revealed an even stronger relationship ($r = .935$, $p < .001$). Confidence in using woodworking machinery explained approximately 87.4% of the variance in confidence teaching woodworking machinery ($R^2 = .874$), suggesting that instructors' perceptions of their operational competence are strongly associated with instructional confidence.

Research Question 3: How do SBAE agricultural mechanics instructors define their sources of knowledge in agricultural mechanics in comparison to personal and professional characteristics?

Participants represented a diverse range of ages, teaching experiences, school settings, and program sizes. However, personal and professional characteristics demonstrated relatively weak relationships with woodworking confidence compared to training experiences and safety preparation. Most respondents taught in rural schools (65.9%, $f = 60$), taught primarily at the high school level (89.0%, $f = 81$), and possessed between 6 and 15 years of teaching experience (45.1%, $f = 41$).

These findings suggested that the development of woodworking knowledge is more associated with exposure to woodworking experiences and safety training than with personal or professional characteristics alone.

Research Question 4: To what extent do SBAE agricultural mechanics instructors perceive their levels of woodworking safety preparation?

Respondents reported high levels of perceived safety preparedness. More than half (53.8%, $f = 49$) strongly agreed that they had received sufficient safety training to keep students safe when using stationary woodworking equipment, while 39.6% ($f = 36$) somewhat agreed. The mean response was $M = 4.46$ ($SD = 0.66$) on a 5-point scale, indicating a high level of perceived preparedness.

Additionally, perceived adequacy of safety training was positively associated with confidence in using woodworking equipment ($r = .417$, $p < .001$) and confidence in teaching woodworking equipment ($r = .411$, $p < .001$). These findings suggested that safety preparation is meaningfully related to woodworking confidence.

Article one findings suggested that woodworking confidence develops through cumulative experiences involving formal instruction, personal practice, safety training, and professional exposure. These findings align with Bandura’s (1997) self-efficacy theory, which identifies mastery experiences as the strongest source of efficacy development.

Article 2: Woodworking Machinery Implementation and Instructional Decision-Making

The second study examined instructors’ perceptions of the instructional effectiveness of stationary woodworking machinery and the factors influencing implementation decisions.

Major findings included

- Stationary woodworking machinery, including table saws, miter saws, band saws, drill presses, and sanders, received the highest ratings for instructional appropriateness.

- These machines also demonstrated the highest levels of instructor training exposure, collegiate preparation, and confidence in both use and teaching.
- Emerging technologies, such as CNC routers, received substantially lower levels of training exposure and instructor confidence.
- Instructors reported considering multiple factors when determining whether woodworking machinery was appropriate for classroom instruction, including safety risks, perceived danger, liability concerns, machine complexity, and school support.
- Although instructors generally expressed high confidence in teaching woodworking machinery, perceptions of danger and liability remained present regardless of confidence level.
- Correlation analyses indicated that confidence in teaching woodworking machinery was not significantly related to perceptions of danger or liability.
- School support, training experiences, and familiarity with equipment appeared to relate more strongly to implementation decisions than perceived danger alone.
- Barriers to woodworking implementation included limited collegiate preparation, low participation in woodworking-focused professional development, liability concerns, equipment availability, facility limitations, and varying levels of administrative support.

Research Question 1: Which woodworking floor machines do Georgia agricultural mechanics instructors identify as instructionally effective for teaching woodworking concepts, skills, and safety?

Respondents consistently identified stationary woodworking equipment as the most instructionally valuable machinery within agricultural mechanics programs. Table saws, miter saws, band saws, drill presses, and sanders received the highest levels of training exposure, confidence ratings, and instructional support.

In contrast, CNC routers, panel saws, and radial arm saws received substantially lower levels of training exposure and instructional confidence. These findings suggested that instructors perceive the greatest instructional value in woodworking equipment with which they are most familiar and experienced.

Research Question 2: What criteria do instructors use when determining whether a woodworking machine is appropriate for classroom instruction?

Instructors considered multiple factors when evaluating instructional appropriateness, including machine difficulty, danger, liability concerns, and school support. Correlation analyses revealed that confidence in teaching woodworking machinery was not significantly associated with perceptions of danger ($\rho = -.134$, $p = .228$) or liability ($\rho = -.178$, $p = .108$).

These findings suggested that instructors' instructional decisions are not solely based on perceptions of risk. Instead, instructors appear capable of recognizing the inherent risks associated with woodworking equipment while also viewing it as educationally valuable.

Research Question 3: To what extent does confidence predict the likelihood of selecting specific woodworking machines for instruction?

Confidence in both operating and teaching woodworking machinery emerged as an important consideration in equipment selection. Instructors were more likely to identify equipment as instructionally appropriate when they possessed higher levels of confidence using and teaching that equipment. This finding further supported the role of self-efficacy in instructional decision-making, suggesting that instructors’ beliefs regarding their capabilities are related to curriculum implementation choices.

Research Question 4: What barriers are associated with instructors' decisions to include or exclude specific woodworking machines in instruction?

Several barriers emerged across respondents. Common concerns included limited training opportunities, inadequate equipment availability, facility limitations, liability concerns, and varying levels of administrative support. CNC routers and other specialized woodworking technologies consistently received lower levels of preparation and confidence than traditional woodworking equipment, suggesting that implementation decisions are shaped by both instructor preparation and broader programmatic resources.

These findings suggested that decisions about implementing woodworking involve balancing instructional value against safety and resource considerations. Instructors appeared willing to teach woodworking when adequate preparation, support, and confidence were present.

Article 3: Instructor Confidence and Perceived Instructional Effectiveness

The third study examined relationships among professional development experiences, woodworking confidence, and perceived instructional effectiveness.

Major findings included

- Instructors reported high levels of confidence in both operating (M = 4.35, SD = 0.73) and teaching (M = 4.25, SD = 0.79) stationary woodworking machinery.

- Woodworking safety training experiences emerged as the strongest predictor of confidence in both equipment operation and instruction.
- Participation in collegiate coursework and PLU training demonstrated comparatively limited predictive value after accounting for safety training experiences.
- Confidence in using woodworking machinery was positively associated with perceived instructional effectiveness.
- Confidence in teaching woodworking machinery was similarly associated with perceived instructional effectiveness.
- Confidence in using and in teaching woodworking machinery exhibited an exceptionally strong positive relationship ($r = .94$, $p < .001$).
- Confidence in using woodworking machinery explained approximately 87.4% of the variance in confidence in teaching woodworking machinery.
- The findings suggested that instructors' perceptions of their technical abilities strongly relate to their instructional confidence and perceptions of teaching effectiveness.

Research Question 1: To what extent does professional development participation predict SBAE agricultural mechanics instructors' confidence in woodworking machinery operation and safety management?

Regression analyses revealed that woodworking safety training experiences significantly predicted confidence in using woodworking machinery ($\beta = .344$, $p = .003$) and confidence in teaching woodworking machinery ($\beta = .239$, $p = .043$). The model predicting confidence in teaching woodworking machinery explained 10.0% of the variance (R^2 = .100), while the model predicting confidence in using woodworking machinery explained 13.1% of the variance (R^2 = .131).

Interestingly, neither collegiate coursework nor PLU participation remained a significant predictor of woodworking confidence, independent of prior safety training experiences. These findings suggested that direct safety training experiences may be more influential than the educational setting in which training occurs.

Research Question 2: To what extent does the SBAE agricultural mechanics instructor's confidence in woodworking machinery operation and safety predict perceived instructional effectiveness in teaching woodworking concepts and skills?

Confidence in using woodworking machinery was positively associated with perceived instructional effectiveness (r = .335, p = .001), and confidence in teaching woodworking machinery was also positively associated with it (r = .293, p = .004).

Multiple regression analyses indicated that confidence variables collectively explained 14.0% of the variance in perceived instructional effectiveness (R^2 = .140, p = .009). Although no individual predictor remained significant after accounting for shared variance, the overall model indicates that instructor confidence is meaningfully related to perceptions of instructional effectiveness.

Research Question 3: What is the relationship between the SBAE agricultural mechanics instructors' confidence levels in safety practices when teaching versus when using woodworking machinery?

The strongest statistical finding across the entire dissertation emerged from this research question. Confidence in using woodworking machinery showed an exceptionally strong relationship with confidence in teaching woodworking machinery ($r = .935$, $p < .001$).

Simple linear regression analysis indicated that confidence in using woodworking machinery explained 87.4% of the variance in confidence teaching woodworking machinery ($F(1,84) = 585.16$, $p < .001$, $R^2 = .874$). This finding provides substantial support for Bandura's (1997) assertion that mastery experiences are directly associated with efficacy beliefs and subsequent performance expectations.

This article demonstrated that confidence serves as a critical mechanism linking experiences in woodworking preparation to instructional practice. Safety training experiences appear to be directly related to the development of instructors' perceptions of confidence, instructional readiness, and perceived effectiveness.

Recommendations for Future Research

- Conduct longitudinal studies examining how woodworking confidence develops throughout preservice preparation, early-career teaching, and experienced practice.
- Investigate the extent to which instructor confidence is associated with actual self-reported confidence, as well as with woodworking skill attainment, safety behaviors, and project completion.
- Examine relationships between woodworking confidence and observed instructional practices through classroom and laboratory observations.
- Explore how facility quality, equipment availability, maintenance practices, and program resources relate to decisions about implementing woodworking.

- Investigate barriers and opportunities associated with integrating emerging woodworking technologies, particularly CNC routers and digitally controlled fabrication equipment.
- Examine differences in woodworking confidence among alternatively certified, traditionally certified, and career-switching agricultural education instructors.

Recommendations for Practice

Recommendations for State and National SBAE Leaders

- Prioritize woodworking safety and agricultural mechanics training as professional development priorities within state and national SBAE programs.
- Increase access to hands-on, kinesthetic learning, agricultural mechanics workshops that emphasize woodworking machine operation, safety management, and instructional strategies.
- Support the development of standardized woodworking safety resources and instructional materials for use across SBAE programs.
- Promote funding opportunities to support local programs in facility improvements, equipment modernization, and safety infrastructure upgrades.
- Encourage inclusion of emerging woodworking technologies while ensuring adequate training accompanies implementation.

Recommendations for SBAE Teacher Educators

- Provide preservice teachers with repeated exposure opportunities to operate stationary woodworking machinery within supervised laboratory environments.
- Integrate woodworking safety management, risk assessment, and laboratory supervision into agricultural mechanics coursework.

- Expand exposure to both traditional woodworking machinery and emerging technologies such as CNC routers.
- Develop instructional experiences that require preservice teachers to teach woodworking concepts and safety procedures rather than simply operate equipment.
- Strengthen partnerships between universities, state staff, and industry to provide authentic woodworking training experiences.

Recommendations for SBAE Teacher

- Pursue ongoing training in woodworking safety and machinery throughout their careers.
- Seek professional development opportunities that provide hands-on experiences with unfamiliar woodworking equipment.
- Regularly evaluate woodworking laboratory safety procedures and update safety practices to reflect current standards.
- Incorporate a variety of woodworking machinery and instructional approaches that provide students with authentic technical experiences.
- Collaborate with experienced agricultural mechanics instructors to expand woodworking knowledge and instructional confidence.
- Continue developing personal technical competence, recognizing that confidence in equipment operation is strongly associated with confidence in teaching woodworking concepts and skills.

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APPENDICES

Appendix A: Questionnaire

Invitational Email:

Hey everyone! You are receiving this because you are someone who teaches Ag Mechanics this year. I am conducting research as part of my doctoral degree at Auburn University. This research explores the use and safety around equipment in the Ag Mechanics Lab. By clicking that you will help, you are indicating your informed consent to participate in the research. Thank you for your help in this crucial research! Click this Link for more information.

☐ I will help

☐ I will not help

What is your current teaching level in Agricultural Education:

☐ High School (9-12 grades)

☐ Middle School (6-8 grades)

☐ I teach both Middle and High School (6-12 grades)

☐ I do not teach either; my current role is with the Georgia State Staff or Area Teacher

☐ I do not teach either; my current role is as an Elementary Agriculture Instructor

What levels of Agricultural Education have you ever taught? (click all that apply)

☐ Elementary School (K-5)

⬚ Middle School (6-8)

⬚ High School (9-12)

⬚ Jr. College/Community College/Trades School

⬚ Four-year College/University

⬚ Extension, County-Based

⬚ Extension, State Wide

Gender:

⬚ Male

⬚ Female

⬚ Non-binary/third gender

⬚ Prefer not to say

What year were you born? (to calculate age)

____

How many years have you been teaching Agriculture as of the beginning of the current school year?

⬚ I have never been an ag teacher

⬚ This is my first year

⬚ I have been teaching for ______ years

What best describes your path to initial certification.

⬚ I student taught as part of an undergraduate degree program

⬚ I student taught as part of a graduate degree program

⬚ I student taught as part of a certification program that was not associated with a degree

⬚ I did not student teach

Which best describes your student teaching experience.

⬚ My student teaching experience was in Agricultural Education

⬚ My student teaching was in something other than Agricultural Education

⬚ I did not student teach

Indicate your levels of completed education. Leave blank if not applicable.

	What was your major?	What institution?
Junior/Community/ Trades/2 yr College	________________	______________
Undergraduate	________________	______________
Masters	________________	______________
Specialist	________________	______________
Doctorate	________________	______________

Your school primarily serves what type of area (rural/town/suburb/urban)?

☐ Rural (outside an urban area)

☐ Town (areas inside an urban area, with population under 50,000)

☐ Suburban (inside an urban area, outside of a primary city, population more than 50,000)

☐ City (inside an urban area principle city with a population more than 250,000)

How much knowledge do you have about Stationary Woodworking Equipment (Table saw, Compound Miter Saw, Jointer, Router, Planer, etc…)?

☐ High

☐ Adequate

☐ Low

☐ None

Please indicate your participation with safety training for Stationary Woodworking Equipment (e.g. table saw, band saw, etc…), select all that apply.

I have received safety training…

☐ I have never received any training on safety specifically for Stationary Woodworking equipment.

☐ in college as part of a course.

☐ in high school as part of an Ag class.

☐ in high school as part of a non-Ag class.

⬚ in middle school as part of a course.

⬚ as part of a formal organization outside of school (like Scouts, BB/BS, 4-H, YMCA, etc.)

⬚ as part of a hobby course or class I did outside of a formal education.

⬚ at a teacher workshop.

⬚ as part of work/employment not related to teaching.

⬚ as part of student teaching/field experiences related to teaching.

⬚ from an adult in my life, not related to an organization (parent/grandparent/neighbor)

How old were you the last time you received safety training for Stationary Woodworking Equipment (or best guess)?

⬚ I have never received training

⬚ Under 11 years old (Elementary school age)

⬚ 12-14 years old (Middle School Age)

⬚ 15-18 years old (High School Age)

⬚ 19-22 years old (College Age)

⬚ >22 years old (Adult Age)

Indicate your level of agreement to the following statement:

I have received enough safety training to keep my students safe when using Stationary Woodworking Equipment.

- ☐ Strongly agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Strongly disagree

Have you ever received any safety training on the following Stationary Woodworking Equipment?

	Yes	No	I don't know what this tool is.
Sander (belt, disc, or combination)	☐	☐	☐
Drill Press	☐	☐	☐
Jointer	☐	☐	☐
Planer	☐	☐	☐
Router or Shaper	☐	☐	☐
CNC router	☐	☐	☐
Band Saw	☐	☐	☐
Miter Saw	☐	☐	☐
Panel Saw	☐	☐	☐
Radial Arm Saw	☐	☐	☐
Scroll Saw	☐	☐	☐

	Yes	No	I don't know what this tool is.
Table Saw	☐	☐	☐

What is your level of knowledge regarding the following?

	None	Below Average	Average	Above Average	High
General Mechanics Safety	☐	☐	☐	☐	☐
Tool Use (General)	☐	☐	☐	☐	☐
Tool Maintenance	☐	☐	☐	☐	☐
Woodworking	☐	☐	☐	☐	☐
Wood Construction/Framing	☐	☐	☐	☐	☐
Plumbing	☐	☐	☐	☐	☐
Concrete/Masonry	☐	☐	☐	☐	☐
Surveying	☐	☐	☐	☐	☐
Electricity (AC)	☐	☐	☐	☐	☐
Electricity (DC)	☐	☐	☐	☐	☐
Small Engines/ Internal Combustion	☐	☐	☐	☐	☐
Power Welding/ Hot Metal Work	☐	☐	☐	☐	☐
Agricultural Machinery	☐	☐	☐	☐	☐
Hydraulics	☐	☐	☐	☐	☐

As part of your collegiate training courses did you ever have any instruction on using the following equipment?

	No	Yes	I don't know what this tool is.
Sander (belt, disc, or combination)	☐	☐	☐
Drill Press	☐	☐	☐
Jointer	☐	☐	☐
Planer	☐	☐	☐
Router or Shaper	☐	☐	☐
CNC router	☐	☐	☐
Band Saw	☐	☐	☐
Miter Saw	☐	☐	☐
Panel Saw	☐	☐	☐
Radial Arm Saw	☐	☐	☐
Scroll Saw	☐	☐	☐
Table Saw	☐	☐	☐

Please indicate your level of confidence in <u>USING</u> the following tools personally.

	Neither Confident Nor Not Confident	Somewhat Confident	Confident	Somewhat Not Confident	Not Confident
Sander (belt, disc, or combination)	☐	☐	☐	☐	☐
Drill Press	☐	☐	☐	☐	☐

	Neither Confident Nor Not Confident	Somewhat Confident	Confident	Somewhat Not Confident	Not Confident
Jointer	☐	☐	☐	☐	☐
Planer	☐	☐	☐	☐	☐
Router or Shaper	☐	☐	☐	☐	☐
CNC router	☐	☐	☐	☐	☐
Band Saw	☐	☐	☐	☐	☐
Miter Saw	☐	☐	☐	☐	☐
Panel Saw	☐	☐	☐	☐	☐
Radial Arm Saw	☐	☐	☐	☐	☐
Scroll Saw	☐	☐	☐	☐	☐
Table Saw	☐	☐	☐	☐	☐

Please indicate your level of confidence in TEACHING using the following tools.

	Neither Confident nor Not Confident	Somewhat Confident	Confident	Somewhat Not Confident	Not Confident
Sander (belt, disc, or combination)	☐	☐	☐	☐	☐
Drill Press	☐	☐	☐	☐	☐
Jointer	☐	☐	☐	☐	☐
Planer	☐	☐	☐	☐	☐

	Neither Confident nor Not Confident	Somewhat Confident	Confident	Somewhat Not Confident	Not Confident
Router or Shaper	☐	☐	☐	☐	☐
CNC router	☐	☐	☐	☐	☐
Band Saw	☐	☐	☐	☐	☐
Miter Saw	☐	☐	☐	☐	☐
Panel Saw	☐	☐	☐	☐	☐
Radial Arm Saw	☐	☐	☐	☐	☐
Scroll Saw	☐	☐	☐	☐	☐
Table Saw	☐	☐	☐	☐	☐

Have you ever attended a Professional Learning Unit (PLU) class on or that included any of the following? If yes, how many (estimate)?

	None, 0 PLU Classes	1 PLU Class	2 PLU Classes	3 PLU Classes	4 or more PLU Classes
Sander (belt, disc, or combination)	☐	☐	☐	☐	☐
Drill Press	☐	☐	☐	☐	☐
Jointer	☐	☐	☐	☐	☐
Planer	☐	☐	☐	☐	☐

	None, 0 PLU Classes	1 PLU Class	2 PLU Classes	3 PLU Classes	4 or more PLU Classes
Router or Shaper	☐	☐	☐	☐	☐
CNC router		☐	☐	☐	☐ ☐
Band Saw	☐	☐	☐	☐	☐
Miter Saw	☐	☐	☐	☐	☐
Panel Saw	☐	☐	☐	☐	☐
Radial Arm Saw	☐	☐	☐	☐	☐
Scroll Saw		☐	☐	☐	☐ ☐
Table Saw		☐	☐	☐	☐ ☐

Do you teach agricultural mechanics?

☐ Yes, I currently teach ag mech.

☐ No, but I normally teach ag mech.

☐ No, but I have many times in the past.

☐ No, but I have at some point.

☐ No, and I never have.

What ag mech courses does your program offer?

☐ Ag Construction

☐ Ag Electricity and Electrical Controls

☐ Ag Mech I

☐ Ag Mech II

☐ Ag Mech III

☐ Ag Power and Machinery

☐ Ag Metals Fabrication

☐ None

Do you teach courses outside of the Ag Ed Curriculum?

☐ Architecture and Construction

☐ Arts, A/v Tech & Tech

☐ Energy

☐ STEM (Any Science, Technology, Engineering, or Math)

☐ Manufacturing

☐ Other Courses, not listed

☐ I only teach courses in the Ag Ed curriculum

Approximately, how many students take agricultural mechanics courses in your program in an average year?

☐ None

☐ 1-25

☐ 26-50

☐ 51-75

☐ 76-100

☐ >100

Please indicate your level of agreement with the following statements.

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
My program has enough space to safely teach agricultural mechanics.	☐	☐	☐	☐	☐
My program has enough equipment to teach agricultural mechanics.	☐	☐	☐	☐	☐
My program has enough consumables (or budget to purchase consumables) to teach agricultural mechanics.	☐	☐	☐	☐	☐
My school values agricultural mechanics.	☐	☐	☐	☐	☐
I value agricultural mechanics.	☐	☐	☐	☐	☐
My community values agricultural mechanics.		☐	☐	☐	☐ ☐
My teaching partners value agricultural mechanics.	☐	☐	☐	☐	☐
My community would benefit from more agricultural mechanics being taught.	☐	☐	☐	☐	☐

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
Agricultural mechanics should be part of the agricultural pathways in GA.	☐	☐	☐	☐	☐
Using stationary woodworking equipment is part of learning agriculture.	☐	☐	☐	☐	☐
Wood construction should be part of agricultural pathways in GA.	☐	☐	☐	☐	☐
Welding and wood construction should be given equal focus in agricultural mechanics.	☐	☐	☐	☐	☐
Things like welding and woodworking should be given over to construction or trades teachers.	☐	☐	☐	☐	☐
We hear too much about ag mech and not enough about the rest of ag ed.	☐	☐	☐	☐	☐
We don't have enough ag mech teachers coming up.	☐	☐	☐	☐	☐
We don't have enough ag teachers coming up.	☐	☐	☐	☐	☐

Using the scale provided, indicate your opinion on each of the following concerns about teaching woodworking in agricultural mechanics.

Difficulty	Too Easy	○	○	○	○	○	○	○	Too Difficult
Danger	Not Dangerous	○	○	○	○	○	○	○	Extremely Dangerous
Liability	No Liability Concern	○	○	○	○	○	○	○	Extreme Liability Concern
School Support	Fully Supported	○	○	○	○	○	○	○	Completely Blocked

We know the following are not what we tell people or what we are told is ok, but if you HAD to choose one, which of the following best describes you?

- ☐ FFA Advisor
- ☐ Livestock Coach/Stock Show Coach
- ☐ Ag Mech Teacher
- ☐ Animal Science Teacher
- ☐ Horticulture Teacher
- ☐ Floral Design Teacher
- ☐ Judging Coach
- ☐ Other: _____________

Describe your personal involvement with Middle School Ag Ed as a student.

- ☐ I was not in middle school Ag, because it was not offered at my school.
- ☐ I was not in middle school Ag, I couldn't fit it in my schedule, but it was offered at my school.
- ☐ I was not in middle school Ag, I didn't want to take it, but it was offered at my school.
- ☐ I was in middle school ag classes.

Describe your personal involvement with High School Ag Ed as a student.

⬚ I was not in high school Ag, because it was not offered at my school.

⬚ I was not in high school Ag, I couldn’t fit it in my schedule, but it was offered at my school.

⬚ I was not in high school Ag, I didn’t want to take it, but it was offered at my school.

⬚ I was in high school ag classes.

Select all organizations you were involved with as a K-12 student:

⬚ Scouting (GSA/BSA/Cub/etc.)

⬚ Young Farmers and Ranchers

⬚ 4-H

⬚ Skills USA/VICA

⬚ DECA

⬚ HOSA

⬚ FCCLA

⬚ FBLA

⬚ PAS

⬚ FFA

⬚ Big Brothers/Big Sisters

- ⬚ Church-Based Group (any)
- ⬚ None
- ⬚ Other: ___________________

Appendix B: IRB Approval

AUBURN UNIVERSITY
Institutional Review Board

EXEMPT DETERMINATION

March 3, 2026

Jason McKibben
3348444434
jdm0184@auburn.edu

Dear Jason McKibben:

On 3/3/2026, the IRB reviewed the following submission:

Protocol Information	Submission Details
Type of Review:	Initial Study
Title:	Equipment use in SBAE Ag Mechanics Labs
Investigator:	Jason McKibben
IRB ID:	STUDY00001125
Funding:	None
Grant Title:	N/A
Grant ID:	None
IND, IDE or HDE:	None
Documents Reviewed:	• HRP-581 - P. Davis - Information Letter.pdf, Category: Consent Form; • IRB Application (New form) , Category: IRB Protocol; • P Davis Reminder Emails version 3.pdf, Category: Recruitment Materials; • P. Davis Safety Post card Version 2.pdf, Category: Recruitment Materials; • Woodworking_stationary_machinery_efficacy Instrument export from Qualtrics.pdf, Category: Survey/Questionnaire;

The IRB determined that this protocol meets the criteria for exemption from IRB review. This determination is valid through 2/23/2029. The IRB has implemented a three-year determination period for Exempt submissions to better manage the active research portfolio.

In conducting this protocol you are required to follow the requirements listed in HRP-103 - INVESTIGATOR MANUAL.

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities impact the exempt determination, please submit a modification in the Endeavor system.

Sincerely,
IRB Administration

Page 1 of 2 Version Date: July 31, 2023