"I Do Not Think I Can Teach How To Use A Framing Hammer?" Pre-Service Agriculture Teachers' Perceived Self-Efficacy Teaching Agriculture Mechanics at California State University, Fresno

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Introduction

The agricultural mechanics pathway is one of the most popular and vital components of school-based agricultural education (SBAE) in California, a leading state in agriculture. Practical instruction in welding, electricity, and woodworking requires teachers with strong technical skills. However, many preservice teachers feel unprepared to teach these subjects. While some research exists on SBAE teacher self-efficacy in the Midwest, little research focuses on California. This study evaluates preservice teachers at California State University, Fresno, and their confidence in teaching agricultural mechanics. It aims to (1) identify differences in required coursework, (2) understand why candidates do not take additional mechanics classes, (3) assess their self-efficacy during student teaching, and (4) provide recommendations to the California State University, Fresno, teacher preparation program. The goal is to equip future educators better to deliver industry-relevant instruction.

Conceptual Framework

Self-efficacy, as defined by Bandura (1977), refers to an individual's belief in their ability to succeed in specific tasks or achievements. Numerous studies have found that teachers often rank their confidence in teaching agricultural mechanics lower than in any other agriculture-related content area (Burris et al., 2010; Wells et al., 2013). Many preservice agriculture teachers report feeling underprepared due to insufficient coursework and training, a trend that continues to be a significant concern (Hainline et al., 2019). This study addresses the central question: Do California State University, Fresno, student teachers feel equipped to teach a wide array of agricultural mechanics topics during their student teaching experiences?

Methods

This descriptive quantitative study assessed the self-efficacy of preservice agricultural education teachers in teaching agricultural mechanics at California State University, Fresno. Participants were student teachers in Fall 2024, selected for their near completion of coursework and active field experience. All 24 candidates were invited, with 22 full and one partial response collected (96% response rate). An anonymous Qualtrics® survey included demographics and a 54-item skills inventory adapted from Clark, Anderson, and Paulsen (2021), covering six areas: Structures, Electricity, Power and Machinery, Soil and Water, Welding, and General Mechanics. Skills were rated on a five-point Likert-type scale from “None” to “Very Strong.” Descriptive statistics (percentages, means, standard deviations) were calculated, and Cronbach’s alpha confirmed strong internal reliability ($\alpha > 0.7$) for each skill category.

Results

The study revealed how preservice agricultural education teachers at California State University, Fresno, perceive their quantity and quality of training in agricultural mechanics. Quantity survey data across 54 skills in six content areas showed that Structures and Construction and Electricity had the highest perceived training (mean = 3.51, moderately strong). Electricity had consistent

ratings (SD = 0.30), while Structures showed more variation (SD = 0.70), suggesting uneven hands-on access. Table 1 displays the grand means and standard deviations for each construct. Power and Machinery scored moderately (means = 3.10 and 3.20) with fairly consistent responses, indicating a generally solid foundation. Soil and Water ranked lowest (training mean = 0.99; quality mean = 2.48), highlighting limited exposure despite its relevance to California agriculture.

Table 1

Grand Mean Scores for Quantity Of Agriculture Mechanics Training by Construct.

Construct	Grand Mean	Grand Standard Deviation
Structures and Construction	3.51	0.70
Electricity	3.51	0.30
Agricultural Mechanics	3.31	0.38
Agricultural Welding	3.30	0.50
Power and Machinery	3.10	0.56
Soil and Water	0.99	0.02

Grand Mean Scores for Quantity of Agricultural Mechanics Training by Constructs Note. Grand means were calculated with the following scaled construct responses. 5= Very Strong, 4= Strong, 3=Moderate, 2 Some, 1= Not at all.

Across several areas, quality ratings exceeded the amount of instruction, suggesting that even limited experiences were impactful. However, the results underscore the need for increased instructional time in underemphasized areas to boost teacher confidence and align with industry needs.

Conclusions/Implications

These findings highlight the need for curriculum improvements in agricultural mechanics. Preservice teachers require repeated, hands-on practice; however, inconsistent training indicates a need for more standardized instruction. Tools such as project-based assessments and skill rubrics could help ensure baseline competency. Limited exposure may stem from factors such as lab access, scheduling, or course availability; these areas should be explored in future research. The results are already shaping curriculum revisions to better integrate technical skills with effective teaching strategies. High-quality instruction is essential for preparing confident, competent teachers. Next steps include expanding this research to the other major California State Universities.

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