Determining the Impact of an Electricity Workshop on the Importance to Teach Electricity

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Introduction

It is essential to equip School-Based Agricultural Education (SBAE) teachers with comprehensive agricultural mechanics training to effectively prepare current and future teachers (Wells et al., 2013). To access this critical training, SBAE teachers must develop a deep understanding of various agricultural mechanics disciplines (Wells et al., 2021). However, challenges are emerging, particularly the diminishing exposure to agricultural mechanics content for SBAE preservice teachers (Burris et al., 2005; Hurbert & Leising, 2000). Teachers who lack the necessary knowledge, confidence, or skills to teach these topics effectively are encouraged to seek alternative avenues for professional development (Clark et al., 2021). Attending workshops is one effective way to gain these essential skills; professional development is specialized training that uses hands-on and lecture-based lessons to increase knowledge and teaching abilities in education (McKim & Saucier, 2013).

Theoretical Framework

The engagement theory posits that individuals learn most effectively when they are meaningfully engaged in activities that are both interesting and relevant to them (Kearsley & Schneiderman, 1998). In the context of education, this theory serves as a primary motivation for SBAE teachers to participate in professional development workshops; they find the skills offered to be pertinent to their interests and careers. The engagement theory encompasses three fundamental principles: relate, create, and donate (Kearsley & Schneiderman, 1998). By attending the electricity workshop, SBAE teachers reinforce these principles and enhance their interest, communication, and teaching abilities within the classroom.

Purpose and Objectives

The purpose of this study is to evaluate the impact of an electricity workshop on SBAE teachers' perceived level of importance to teach electricity. This research aligns with the American Association of Agricultural Education's *National Research Values Related to* Advancing Public Knowledge of AFNR (agriculture, food, and natural resources) Systems (AAAE, 2023). By connecting to this value, we seek to enhance our understanding of the impact of an electricity professional development workshop through the lens of teaching these essential skills to current and future SBAE students. Our objectives were to determine the impact of the electricity workshop on the SBAE teachers' perceptions of the importance to teach four electricity constructs: 1) electrical safety and tools, 2) switches and receptacles, 3) making electrical connections, and 4) electrical testing.

Methods

This study sought to determine the impact of an electricity workshop on SBAE teachers perceived importance of teaching electricity (i.e., electrical safety and tools, switches, and receptacles, making electrical connections, and electrical testing). Before and following the Agricultural Mechanics Academy (AMA), one-and-a-half days were dedicated to electricity. A paper-based questionnaire was developed, reviewed by a panel of experts consisting of five with SBAE experience and five with industry training experience, then revised accordingly. SBAE teachers (n=80) who attended the electricity training were asked to rate the importance of teaching 29 electrical skills from the four electricity constructs. The workshop enables SBAE

teachers to enhance their communication, teaching methods, and engagement in the classroom, particularly regarding electricity. Post-hoc reliability yielded Cronbach Alpha construct scores ranging from 0.869-0.930.

Results

After the electricity training, the grand mean change in perceptions was most significant for *Electrical Safety and Tools*, which increased by 0.34. In contrast, *Electrical Testing* decreased from 4.54 to 4.47, a mean difference of -0.07. Pre-workshop, the highest score was for *Switches and Receptacles* at 4.64 (SD = 0.44), while both *Electrical Safety and Tools* and *Electrical Testing* had the lowest at 4.54 (SD = 0.73; SD = 0.74) respectively. Post-workshop, *Electrical Safety and Tools* had the highest score of 4.79 (SD=0.35), while *Electrical Testing* remained the lowest at 4.47 (0.81).

Table 1

Grand Means Scores of Importance to Teach Electricity Skills

	Pre-Workshop		Post-Workshop		
Electrical Construct	M	SD	M	SD	MD
Electrical Safety and Tools	4.54	0.73	4.79	0.35	0.34
Switches and Receptacles	4.64	0.44	4.64	0.44	0.20
Making Electrical Connections	4.49	0.70	4.57	0.53	0.08
Electrical Testing	4.54	0.74	4.47	0.81	- 0.07

1 = No Importance; 2 = Somewhat Important; 3 = Moderately Important; 4 = Very Important; 5 = Extremely Important

Conclusions and Recommendations

Our findings indicate that SBAE teachers gained valuable knowledge and skill development from the electricity training, which positively influenced their perceptions of the importance of teaching electricity. This aligns with the research by Rasty et al. (2017), which established a correlation between the perceived importance of teaching and the amount of electrical training received. Consequently, we conclude that the electricity training led to a modest shift in the perceived importance of teaching electrical concepts. We believe the modest change was due to the participants already identifying the importance of teaching electricity and were seeking out the training they needed by attending the training during the summer.

We recommend conducting additional nationwide workshops focused on electricity training, as many of the SBAE participants came from out of state. We also recommend ensuring that teacher preparation programs have an electricity curriculum embedded into their degree programs to provide skills utilized within the secondary classrooms. Additionally, we suggest further research comparing the electricity curriculum participants were teaching prior to and after attending AMA, specifically assessing the actionable changes as a result of participating in professional development.

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