

**Determining if a Relationship Exists Between School-Based Agricultural Education
Teachers Knowledge and Importance to Teach Electricity**

Dylan Carpenter & Dr. Ryan Anderson
Texas State University

Determining if a Relationship Exists Between School-Based Agricultural Education Teachers Knowledge and Importance to Teach Electricity

Introduction

School based agricultural education (SBAE) plays a crucial role in preparing our students with technical, career readiness, and leadership skills. These are necessary for students' success in the world of agriculture. To give students this success it is impeccably important to have SBAE teachers that value the importance of post-secondary agricultural education and give them the knowledge to lead these courses. SBAE teachers must make the effort to stay educated and trained in these fields of study to stay relevant and prepared (Shultz et al., 2014). To support and maintain a well-educated student in agriculture you must have properly trained teachers. There is a shortage of SBAE teachers in the United States (Smith et al., 2019). Agriculture remains the backbone of this country we must allow enough resources to prepare teachers to ensure we continue to produce enough SBAE teachers.

Theoretical Framework

The theoretical framework behind this study is Human Capital Theory. This emphasizes the value of investing in training for education. This will enhance the individuals' skills and productivity (Becker, 1964). With SBAE teacher training in electrical systems this can be seen as an investment that can further aid teachers' technical knowledge and skills and their ability to effectively teach the curriculum (Clayton & Norris, 2025)

Purpose and Objectives

The purpose of this study was to evaluate the relationship between SBAE teachers' electrical knowledge and perceived level of importance to teach electricity within the SBAE curriculum prior to and after attending a workshop. The four objectives of this study are: 1) Determine if a relationship exists between SBAE teachers' knowledge and importance to teach electrical safety and tools. 2) Determine if a relationship exists between SBAE teachers' knowledge and importance to teach the installation and operation of electrical switches and receptacles. 3) Determine if a relationship exists between SBAE teachers' knowledge and importance to teach how to make electrical connections. 4) Determine if a relationship exists between SBAE teachers' knowledge and importance to teach electrical testing methods.

Methods

To meet the objectives of our study, we collected data prior to and after a workshop that included electricity. A quantitative research approach was employed to measure potential shifts in teachers' perceptions regarding the importance and knowledge of teaching specific electrical competencies. The workshop focused on key topics such as electrical safety, switches and receptacles, creating electrical connections, and electrical testing, with participants constructing single-pole, three-way, and four-way circuits.

Results

Each skill was correlated within the corresponding skill area rather than across skill areas. For example, the importance of teaching electrical safety in SBAE was correlated to the perceived knowledge of electrical safety training received at the post-secondary level. The data displayed in Table 1 depicts the relationship between the electrical skills in which respondents rated the perceived importance to teach in SBAE and electrical knowledge received prior to and after attending a workshop.

Table 1

Spearman Rho Correlations Between Importance to Teach Electrical Testing in School Based Agricultural Education and Ability to Perform Electrical Tests.

| | <i>Pre-Importance</i> | | <i>Post Importance</i> | |
|--|-----------------------|-----------------------|------------------------|-----------------------|
| | <i>Pre Knowledge</i> | <i>Post Knowledge</i> | <i>Pre Knowledge</i> | <i>Post Knowledge</i> |
| Electrical Safety | | | | |
| Identifying electrical safety organizations | .052 | .294* | .590* | .449* |
| Using safety label codes and colors | .107 | .337* | .336* | .207 |
| Using approved personal protective equipment | .223* | .039 | .385* | .254* |
| Using electrical hand tools | .217 | -0.33 | .417* | .283* |
| Using a test light | .097 | .024 | .274* | .460* |
| Using receptacle tester | .063 | -.095 | .310* | .159 |
| Using a digital multimeter | .010 | -.109 | .220* | .321* |

Note. * $p < .05$

Conclusions and Recommendations

There were no statistically significant relationships between the importance to teach electricity and the knowledge possessed by the participants prior to attending the workshop, with the exception of using approved PPE. This suggests that the participants recognized the importance of teaching electricity despite limited knowledge. Which is reinforced by participating in a summer workshop. There were only two skills that had a positive relationship between the importance to teach electricity prior to attending the workshop and the knowledge gained at the workshop. There was a statistical relationship between what teachers thought was important after attending the workshop and what they knew going into the workshop. This reinforces what they thought was important to teach despite a lack of knowledge. There was a statistical relationship between five of the seven electrical safety skills it should be noted that using safety label codes and colors did not have a statistical relationship after the workshop. This could be a result of the instructor being color blind and working with the participants to overcome challenges related to color coding used in the electrical industry. The findings reinforce the recommendations by Wells et al. (2021) by providing a positive experience in agricultural mechanics. We recommend other post-secondary institutions and state teachers associations replicate similar training opportunities.

References

- Becker, G. S. (1964). *Human Capital*. <https://doi.org/10.7208/chicago/9780226041223.001.0001>
- Crayton, T., & Norris, W. (2025). Turning the gears: Assessing agricultural educators' perceptions of importance and competence to teach agricultural mechanics. *Journal of Agricultural Education*, 66(3), 6. <https://doi.org/10.5032/jae.v66i3.3185>
- Smith, A. R., Lawver, R. G., & Foster, D. D. (2018). National Agricultural Education Supply and Demand Study, 2017 Executive Summary. Retrieved from: <http://aaaeonline.org/Resources/Documents/NS D2016Summary.pdf>
- Trickett, L., Byrd, A. P., Anderson, R. G., & Haynes, J. C. (2023). Preparing pre-service agricultural education teachers to teach agricultural mechanics: Are we doing enough? *Journal of Agricultural Education*, 64(3), 261–273. <https://doi.org/10.5032/jae.v64i3.80>