Saddle Up for Science: Measuring Growth in Animal Science Knowledge Among Educators in an Industry-Aligned Professional Development Cohort

Introduction, Theoretical Framework, Purpose, and Objectives

The agricultural educator is often required to provide comprehensive instruction on topics such as animal nutrition, genetics, reproduction, health, and veterinary science, but many educators report feeling uncomfortable teaching animal science (Wells et al., 2023; Wood et al., 2024). To be successful in teaching animal science, it often requires a broad range of knowledge, skills, and industry practices (Wells et al., 2023). In addition to formal instruction in animal science, agricultural educators are often required to assist students with animal science projects (Norris et al., 2025). If educators are not confident in their animal science knowledge and skills, their students' SBAE experience could be negatively impacted. To address this issue, professional development in animal science is often recommended (Estepp et al., 2014; Wells et al., 2023). Human capital theory purports that as educators gain input from specialized training, education, and experience, they become more confident in their work (Becker, 1993). In the context of this study, providing practical professional development in animal science to educators in need could increase their human capital in the field (Becker, 1993).

The purpose of this study was to measure perceived changes in competence to teach animal science among agricultural educators participating in a year-long professional development cohort. The following research objective guided this study:

1.) Assess the perceived change in competence to teach animal science of agricultural educators participating in a year-long professional development cohort.

Methods

We used a descriptive correlational research design to execute the objective of this quantitative study. The participants were nine agricultural educators in New Mexico with less than five years of experience teaching agricultural education who participated in a year-long animal science professional development cohort. This industry-aligned professional development experience was supported by the Professional Development for Agricultural Literacy, project award no. 2024-67038-42605, from the U.S. Department of Agriculture's National Institute of Food and Agriculture. We selected the participants through a competitive application process based on their limited background and knowledge in animal science, which demonstrated a need for professional development. Additionally, all participants taught in schools with high minority populations and low-income students.

We developed the instrument in Qualtrics using 20 national animal science, agriculture, food, and natural resources (AFNR) standards from the National Council for Agricultural Education (NCAE, 2015). We asked the participants to rate their competence in teaching each standard using a five-point Likert scale, which ranged from 5 = *Extremely Competent*, 4 = *Very Competent*, 3 = *Moderately Competent*, 2 = *Slightly Competent*, to 1 = *Not Competent at all*. We measured the instruments' reliability using Cronbach's Alpha reliability coefficients. The reliability coefficients for the constructs ranged from .90 to .97. According to Ary et al. (2010), these values meet the threshold for a reliable analysis. We distributed the instrument to the agricultural educators four times throughout the professional development. The first and second distributions of the instrument were at the beginning and end of the training in November 2024.

The third distribution occurred in February 2025, midway through the program, and the fourth distribution took place in April 2025, after the training. All nine participants completed the four iterations of the instrument, resulting in a 100% response rate.

We analyzed the data using a repeated-measures analysis of variance (ANOVA) to evaluate changes in competence to teach animal science over time. We used the Shapiro-Wilk's test to measure the data's normality on all four constructs, and all four variables were normally distributed and did not violate the assumption. To assess data sphericity, we used the Greenhouse-Geisser test due to its conservative estimation (Stevens, 2009). The test indicated that the assumption of sphericity was met.

Results

The participating educators' competence in teaching animal science was measured four times. The first time ($M = 2.94$, $SD = .90$) was at the beginning of the first training in November of 2024, and the second time ($M = 3.22$, $SD = .78$) was at the end of the November training. The third measure ($M = 3.63$, $SD = .47$) was taken at the midpoint of the program in February 2025, and the fourth measure ($M = 4.12$, $SD = .45$) was taken after the training in April.

A repeated measures ANOVA was used to assess statistically significant changes in competence. The analysis suggested that the participants' competence increased significantly, [$F(3, 24) = 9.60$, $p < .001$], throughout the program (see Table 1). Additionally, partial eta squared ($\eta_p^2 = .55$) was used to measure effect size, and the observed power of the analysis was .99. These values indicate a large effect size and observed power (Cohen, 1988).

Table 1

Repeated Measures ANOVA Results for Change in Animal Science Competence

F	*df*	Error *df*	*p*	η_p^2	Observed Power
9.60	3	24	<.001	.55	.99

Note. $\alpha = .05$ and $n = 9$.

Conclusions, Implications, and Recommendations

The results of this study indicated that the year-long professional development experience provided to the selected educators effectively increased their competence in teaching animal science. This professional development experience aligns with Wells et al.'s (2023) recommendation to provide practical animal science training to educators, thereby increasing their human capital in animal science (Becker, 1993). The human capital of agricultural educators is directly linked to their engagement in specialized training, education, and experience within animal science (Becker, 1993). This professional development experience targeted areas of animal science that educators may encounter through formal instruction, FFA, or SAE. While this professional development experience substantially enhanced the participating educators' competence in teaching animal science, we were only able to provide it to nine educators in New Mexico. We recommend expanding the program to reach a larger audience of educators. Expanding the program to other states and increasing the number of participants could help ensure that participating educators feel confident teaching animal science. We also recommend conducting additional studies to measure the effectiveness of the animal science professional development program if it were expanded.

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