What Agricultural Mechanics Laboratory Management Knowledge and Skills Do Kentucky Agriculture Teachers Need?

Thomas Poole, Ed.D.
Murray State University
Hutson School of Agriculture
207 South Oakley Applied Science Building
Murray, KY 42071
tpoole4@murraystate.edu

Trent Wells, Ph.D.
Murray State University
Hutson School of Agriculture
101B South Oakley Applied Science Building
Murray, KY 42071
kwells23@murraystate.edu

Mark S. Hainline, Ph.D.
Sam Houston State University
School of Agricultural Sciences
440L Fred Pirkle Engineering Technology Center
Huntsville, TX 77341
msh004@shsu.edu

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Introduction and Conceptual Framework

Agricultural mechanics is primarily a hands-on, laboratory-based agricultural subject matter area. Hence, it is imperative that agriculture teachers be well-versed in teaching and learning practices that support effective agricultural mechanics instruction, including managing agricultural mechanics laboratories (Wells et al., 2021). Scholars (i.e., Hainline & Wells, 2019; Wells et al., 2021) have indicated that agriculture teachers in Iowa, Arkansas, Louisiana, Oklahoma, and Texas need a wide range of knowledge and skills pertinent to managing agricultural mechanics laboratories. There is little recent scholarship that identifies the agricultural mechanics laboratory management knowledge and skills that Kentucky agriculture teachers need. The current study was designed to address this literature gap. We employed Wells et al.'s (2021) agricultural teacher education and agricultural industry partnership model to conceptually frame our study. Their model notated the components impacting the preparation of agriculture teachers. One such element of Wells et al.'s (2021) model is *Experienced Teachers' Perceptions of What is Important*. Experienced agriculture teachers provide feedback that agricultural teacher educators can use to guide the development of pre-service agriculture teachers (Wells et al., 2021). Experienced Kentucky agriculture teachers provided the data for our study. Our study aligned with the *Increasing Prosperity Through Innovation in AFNR Systems* research value (American Association for Agricultural Education [AAAE], 2023).

Purpose

As part of a larger study, the purpose of the current study was to identify the agricultural mechanics laboratory management knowledge and skills that Kentucky agriculture teachers need to successfully teach agricultural mechanics.

Methods

Because the current study was a direct replication of Wells et al.'s (2021) inquiry, we used their Round One data collection instrument to guide our study. We used a three-round Delphi technique to conduct the current study during the 2024-2025 academic year. We used Qualtrics to collect all data and distribute e-mail correspondence. Further, we used IBM® SPSS® software (Version 29.0) to analyze all data. We first sought nominations of qualified, experienced agriculture teachers from both Agricultural Education state staff and agricultural teacher educators in Kentucky, who provided us with an initial group of 46 agriculture teachers to serve as our panel members. We also employed snowball sampling procedures via our Round One instrument, increasing our panel size to 53 agriculture teachers. Our Round One instrument contained 12 items and included respondent characteristics items and open-response items. Within one of the open-response items, we specifically asked each panel member to identify the agricultural mechanics laboratory management knowledge and skills that Kentucky agriculture teachers need. Thirty panel members responded to our Round One instrument, yielding a response rate of 56.6%. Further, they provided 77 unduplicated knowledge and skill items for our Round Two instrument.

In Round Two, we presented the 77 items back to the 30 panel members who participated in Round One. To facilitate responses regarding the perceived importance of each item, we used a six-point, Likert-type scale (1 = *Strongly disagree*, 2 = *Disagree*, 3 = *Slightly disagree*, 4 = *Slightly agree*, 5 = *Agree*, 6 = *Strongly agree*) within our Round Two instrument. Twenty-two panel members participated in Round Two, yielding a 73.3% response rate. Like Wells et al. (2021), we designated an individual item as having met consensus if at least 75% of panel members either *Agreed* or *Strongly agreed* on the importance of that item. Sixty-eight items met consensus during Round Two. We re-presented the eight items that fell within the 51% to 74% threshold on the Round Three instrument. No items fell below the 51% threshold. Our Round Three instrument used the same six-point, Likert-type scale as our Round Two instrument. We invited 22 panel members who participated in Round Two to likewise participate in Round Three; 18 did so, yielding a response rate of 81.8% for Round Three. One additional item achieved consensus during Round Three. Across all three rounds, 69 items achieved consensus.

Results

The typical panel member had taught agricultural education for 14.8 years (*SD* = 9.3) and had taught agricultural education in Kentucky for 14.6 years (*SD* = 9.2). We presented the eight agricultural mechanics knowledge and skill items that met 100% consensus in Table 1 (below).

Table 1

Selected Round Two and Three Findings: Agricultural Mechanics Laboratory Management Knowledge and Skill Items That Reached 100% Consensus

Item	*n*	% Agreement
Using good "common sense" when teaching agricultural mechanics[a, b]	21	100.0
Properly setting up an oxy-fuel torch[a, b]	21	100.0
Ensuring that student learning is taking place[a, b]	21	100.0
Properly connecting and adjusting regulators[a, b]	21	100.0
Properly checking oxy-fuel torches for leaks[a, b]	21	100.0
Properly setting gas pressures for oxy-fuel torch work[a, b]	21	100.0
Properly lighting an oxy-fuel torch[a, b]	21	100.0
Properly managing and supervising students (ex. behavior, grouping, etc.)[a, b]	21	100.0

Note. [a]Item reached consensus during the second round; [b]Item was not answered by all panel members. 1 = *Strongly disagree*, 2 = *Disagree*, 3 = *Slightly disagree*, 4 = *Slightly agree*, 5 = *Agree*, 6 = *Strongly agree*.

Conclusions and Recommendations

The panel members identified 69 individual knowledge and skill items that Kentucky agriculture teachers need to successfully teach agricultural mechanics. Interestingly, only eight items met 100% consensus. We recommend that: (a) our study be replicated at regular intervals to identify changes in Kentucky agriculture teachers' agricultural mechanics laboratory management knowledge and skill needs, (b) other scholars replicate the current study in their respective states, and (c) Agricultural Education state staff and agricultural teacher educators in Kentucky use the results of the current study to help guide the preparation of agriculture teachers. Our findings are not generalizable to agriculture teachers beyond Kentucky.

References

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