Developing an Agricultural Mechanics Academy

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Introduction

Agricultural mechanics courses are widely popular throughout U.S. high schools, training secondary education students to become tradesmen for welding manufacturing, electrical maintenance, engine repair, and more. In order for agricultural mechanics instructors to accurately reflect current industry standards and practices, they are encouraged to maintain relevant curriculum (Shultz et al., 2014). To be successful instructors must also be informed and confident on how to perform these practices. Historically, insufficient agricultural mechanics training at a post-secondary level has ultimately led to inexperienced instructors that are unfamiliar and under prepared with concepts they are expected to teach (Clark et al., 2021).

Instructors who lack proper training are encouraged to participate in weekend and summer workshops that will enhance their skillset and help them to provide more informed, well-rounded lessons. This innovative idea of an agricultural mechanics professional development workshop was created with the intention of improving its participants' ability to teach agricultural mechanics to their students, as well as enhance their laboratory awareness and management skills. This workshop was also intended to prepare secondary agricultural education students to fill the various skills gaps in the agricultural mechanics workforce.

Workshop Procedures

The Agricultural Mechanics Academy (AMA) is a ten-day, grant funded, professional development workshop held at [UNIVERSITY]. The academy included trainings in the areas of small gasoline engine fundamentals and management; electrical systems and residential wiring; and welding principles and applications. These trainings aimed to target high-focus areas of secondary and post-secondary agricultural mechanics concepts. Of the 78 applications received from high school agricultural mechanics teachers across the U.S., 20 participants were selected to attend AMA. Selection for participation was based upon the applicants' prior experience levels and expected future agricultural mechanics course loads indicated in their application. The goal of the AMA was to train SBAE instructors who possessed the least amount of experience, while simultaneously having the largest course load of agricultural mechanics courses for their upcoming school year.

Days One, Two and Three of the academy were spent training and focusing on small gas engines through hands-on lab trainings and classroom curriculum. The small gas engine trainings were led by a Briggs and Stratton training specialist. Days Four, Five, and Six of the academy were focused on residential electrical wiring hands-on trainings. These trainings were led by [UNIVERSITY] instructors. Day Seven of the AMA was spent training the participants oxyacetylene cutting and welding. Finally, days Eight, Nine, and Ten were spent training the participants in Shielded Metal Arc Welding (SMAW) and Gas Metal Arc Welding (GMAW) with hands-on lab trainings and classroom curriculum sessions. This portion of the academy was led by Lincoln Electric *Train the Trainer* instructors and focused on teaching maintenance of welding machines, welding processes constructs, and multi-configuration welding performance.

Results to Date

Results from our first AMA workshop were collected through pre- and post-completion surveys. The surveys were intended to evaluate the participants' perceived level of ability, knowledge, and importance of the various lessons covered during the workshop, using a five-point Likert-type scale. The results from our in-service training workshop show that the participants experienced significant positive changes from all provided trainings. Our AMA participants expressed that they saw a significant increase in their perceived knowledge, importance, and ability to teach small gas engines, residential electrical wiring, oxyacetylene cutting/welding, and welding constructs. Participants also expressed that they realized significant positive impacts on their personal ability to perform small gas engine fundamentals and management, electrical systems and residential wiring, and the various welding principles and applications covered during the academy. These positive impacts on our SBAE participants' knowledge, importance, and ability to perform agricultural mechanics constructs will enable them to provide higher quality lessons to their future students.

Future Plans

The format of our first AMA was highly successful, and at the recommendations of our past participants, we have elected to add AMA Ambassadors to our future academies. The AMA Ambassadors are comprised of previous participants who have successfully implemented the curriculum into their respective SBAE programs. AMA ambassadors will help bridge the gap between industry trainers and classroom practitioners during the academy trainings, ensuring seamless transferability to secondary education students. Our future plans for the academy are to locate external funding to secure long-term sustainability of the program. This funding will also ensure that registration fees are not a barrier to future participants. We also plan to create an Advanced Agricultural Mechanics Academy that provides an additional training opportunity to those who have already completed AMA or who already understand the basics of agricultural mechanics. The Advanced Agricultural Mechanics Academy could potentially cover computer-aided design, electronic fuel injection, and other topics not included in AMA.

Associated Costs

The AMA workshop was hosted and facilitated at no cost to the University or department. Upon acceptance into AMA, participants were only responsible for initial travel to the workshop and final travel back home. This project was funded by a USDA Professional Development grant, covering registration and entry fees for all participants. The grant also aided in funding tools, curriculum, and equipment used during the workshop, as well as gifting personal equipment and curriculum for participants to return home with. Industry partnerships were created with welding, engine, and local gas supply companies to provide free breakfast and lunch to our participants every day of the workshop. Without grant funding, it would cost participants approximately $2,000 to attend the AMA workshop as currently designed.

References

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