

**Innovative**

**Tractor Technician Career Development Event Professional Development Workshop:  
Classroom Instruction to Career Opportunities**

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**Introduction**

According to the National Research Agenda for Agricultural Education (Roberts, Harder, & Brashears, 2016), research priority area three seeks to provide a sufficient scientific and professional workforce that addresses the challenges of the 21<sup>st</sup> century. This innovative idea poster sought to explain the Texas FFA Tractor Technician Career Development Event (CDE) Professional Development Workshop and promote the FFA contest to other states. The Texas FFA Association currently offers 28 CDE's for its members (Texas FFA Association, 2019). One of these contests is the Tractor Technician CDE. This contest was designed as an opportunity for students to receive hands-on training which empowers them with highly marketable skills, with the ultimate goal of employment upon graduation (Texas FFA Association). As a result of participation within this contest, students apply mechanical knowledge, critical thinking, and problem-solving skills that also include interaction with industry professionals during the contest. This event is supported by the standardized curriculum and courses set forth by the Texas Education Agency, or TEA, (2019). The rules for the contest indicate that a team shall consist of three junior/senior level students who are currently enrolled in a school-based agriculture education course and are a current member of the state of Texas FFA Association. Tractor Technician CDE teams can only compete at the state level contest once and must wear a FFA jacket during the competition (Texas FFA Association). Therefore, with the popularity of agricultural mechanics courses within Texas and the inherent participation in agricultural mechanics related CDEs, many teachers either lack the skills necessary to train a Tractor Technician CDE team or have little to no experience using a farm tractor. This need was the main cause for the creation of this professional development workshop and delivery format.

**Program Phases**

This contest consists of three parts: a written exam, appraisal of tractor/machinery components, and locating and correcting malfunctions in agricultural tractors (Texas FFA Association, 2010). The written exam portion of the contest consists of one hundred questions (true/false, multiple choice, etc.) that are based upon state mandated curriculum or Texas Essential Knowledge and Skills (TEKS). The appraisal of tractor/machinery components portion of the contest allows participants the opportunity to appraise 20 components or parts from agricultural tractors/machinery. Each component is appraised to determine if the component requires service, replacement, or is in functioning condition. These components can include electrical, power train, engine, cooling, lubrication, hydraulic, and safety system components. The final portion of the contest is designed to test student's knowledge and critical thinking skills. The *de-bugging* portion of the contest challenges students to locate five deliberately placed malfunctions in a diesel fueled tractor. Students are allocated 30 minutes to locate, test, and repair each malfunction and then safely drive the tractor around a pre-designed course (Texas FFA Association, 2010). Currently, this contest is offered annually at: multiple invitational contests held across the state, 4 multi-area contests for all 12 FFA areas, and the state contest which is held in conjunction with the Houston Livestock Show and Rodeo. The top 3 teams win several thousand dollars of hand tools which are donated by SK Tools. To facilitate the further professional development of teachers, three tractor

dealerships near Corpus Christi, Texas volunteered tractors and technicians to discuss basic electrical troubleshooting on farm utility size diesel tractors. Teachers had the chance to observe the correct electrical troubleshooting process, ask the technician questions, and utilize electrical diagnostic tools. This professional development workshop lasted 90 minutes.

### **Results to Date**

Concluding the workshop, participants were asked via email to provide responses to four open-ended questions utilized to evaluate the effectiveness of the workshop. Listed below are some comments from the four open-ended questions:

**Question 1:** What portion of the Tractor Technician CDE workshop did you find most beneficial to you?

- "The Hands on use of the multi meters on the specific tractors and showing where the ports are located to check" and the opportunity to observe technicians performing diagnostic checks.
- "Being able to talk the technicians from the different brands was a great benefit. They were each able to give a little bit different demonstration as it related to that tractor brand and were able to answer questions specific to their tractors."

**Question 2:** What portion of the Tractor Technician CDE workshop did you perceive to be of least value to you?

- Generally, all participants appreciated the effort applied by coordinators and technicians alike. Negative comments were limited to "Standing out in the heat", and "wish it could have been more advanced, but I realize why it was that way".

**Question 3:** How do you expect any knowledge or experiences gained from the Tractor Technician CDE workshop to enhance your teaching of tractor engine diagnostics?

- Teachers expressed a definite increase in their basic knowledge and ability to teach tractor electronics evaluation or diagnostics, "I will have more confidence when teaching those skills to my students", and "my students will definitely spend more time using the multi-meter."

### **Costs/ Resources Needed**

There were no costs to the researchers who developed and delivered this professional development opportunity. Three local tractor dealers in the Corpus Christi, Texas area donated the use of three tractors and three dealership technicians for a half day. However, if the workshop was to be improved for the future, teachers would be required to bring an electric multimeter to the workshop.

### **Future Plans**

Based upon the positive responses of this workshop from the participants, the researchers will continue to offer Tractor Technician CDE workshops at the 2020 Texas AFNR Professional Development Conference and focus on component evaluation with an emphasis on sensors and controls found on modern farm tractors. Local tractor dealers will also be included in the planning of this workshop and the assistance of dealer technicians will be requested.

## References

- Roberts, T. G., Harder, A., & Brashears, M. T. (Eds.). (2016). American Association for Agricultural Educational national research agenda: 2016 – 2020. Gainesville, FL: Department of Agricultural Education and Communication.
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