

**Agriculture Teacher Participation in the Kansas FFA Agriscience Fair**

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### **Introduction/Need for Research**

American students are trailing the rest of the world in mathematics and science (Sahin, 2013). Today, agricultural companies are reporting a shortage in graduates in STEM fields and the number of positions in the STEM fields is growing (Goecker, Smith, Fernandez, Ali, & Theller, 2015).

A possible means to help address these issues is through inquiry-based education and the FFA Agriscience Fair. In this event, students develop their own research project and then present their research findings to a panel of judges, which may also help the student develop skills in areas such as creative thinking, public speaking, and organizational skill (Murie, 2015). Seventy-eight percent of participants in the Utah FFA Agriscience Fair indicated the event had an impact on their future career choice in a STEM field (Dutton & Sorenson, 2016). Despite the benefits of the Agriscience Fair, Kansas has had very low participation in this event, fielding only projects from six schools last year. There has been little research conducted that analyzes current interest in the event and areas for improvement.

### **Theoretical Framework**

Participation (or lack thereof) in the Kansas FFA Agriscience Fair was examined using Azjen's Theory of Planned Behavior (Ajzen, 1991). The theory includes perceived behavioral controls, attitude toward behavior and subjective norms as predictors of behavior.

### **Methodology**

This study examined agriscience research perspectives Kansas agriculture teachers. A researcher-developed survey instrument collected the data. The instrument included three facets: past or current Agriscience Fair or student research involvement, inquiry-based curriculum and use of Curriculum for Agricultural Science Education (CASE) in their classroom, and teacher relationships and collaboration with science departments. Questions asked were either yes/no or Likert-type questions on a five point scale where 1 = *strongly disagree* and 5 = *strongly agree*.

Three research questions guided this study:

1. What is the current level of participation in the Kansas FFA Agriscience Fair?
2. Do CASE teachers have more students complete agriscience research projects?
3. Do agriculture teachers cooperate with science teachers?

### **Findings**

The instrument was distributed to all Kansas agricultural science teachers ( $N = 223$ ) via Qualtrics. A response rate of 35% was obtained ( $n = 79$ ). Of the survey participants, 51.9% were male ( $n = 41$ ), and 48.1% were female ( $n = 38$ ). The average age of participants was 31 to 35, which an average teaching experience between 6 to 10 years.

The first research question addressed the level of participation. There was minimal involvement in the Kansas FFA Agriscience Fair, with only 15.4% ( $n = 12$ ) indicating past participation. Some teachers are having students complete research projects in their own classroom ( $n = 21$ ) but, almost half of them ( $n = 9$ ), have not competed in the Kansas FFA Agriscience Fair.

A greater percentage of female teachers ( $n = 15$ , 40.5%) have completed CASE curriculum, as compared to males ( $n = 8$ , 19.5%). This did not result in more female CASE teachers participating in the Agriscience Fair. Only 21.7% ( $n = 5$ ) stated that their student research projects came from the capstone CASE course. However, not every teacher who teaches a CASE class necessarily has a capstone project established.

Finally, the majority of agricultural science teachers reported positive relationships with their science counterparts ( $n = 53$ , 68%); but less than half of the teachers who have completed student research projects ( $N = 21$ ) indicated those collaborations were with their science teachers ( $n = 9$ , 43%). Our data shows little involvement in other science fairs ( $n = 7$ , 8.9%), such as an ISEF-affiliated fair.

### **Conclusions**

The survey had a lower than ideal response rate, which is a limitation for the conclusions to be generalized, but the respondents are representative of Kansas agriculture teachers in terms of demographics. Results indicate that teachers are not participating in the Kansas FFA Agriscience Fair. This lack of participation could be a lack of perceived control in their ability to facilitate scientific research (Ajzen, 1991). It is evident that work needs to be done to increase the number of teachers facilitating research projects and participating in the FFA Agriscience Fair in Kansas.

A higher number of female teachers have completed CASE training, but there was no increase of female teachers with students participating in the agriscience fair. Teachers reported positive relationships with science teachers, but they are not utilizing them to assist with agriscience research projects. Due to the low participation in the event, there is not pressure in the state for teachers to prepare students to conduct research. This lack of a subjective norm and the perceived barriers to participation (Ajzen, 1991) needs to be further investigated if we are to meet the demand for STEM graduates.

### **Implications/Recommendations**

There are opportunities to increase participation in the Kansas FFA Agriscience Fair. We confirmed that there has been very limited involvement in the event; however, we found teachers are implementing research projects in their programs, showing a potential opportunity to increase participation. The relationship between science and agricultural science teachers should be further studied to determine why or why not the two groups work together to develop student research projects. Due to the complex nature of students developing Agriscience Fair projects, collaboration between the two departments may be necessary to develop a complete project.

A qualitative study should be conducted to further investigate the barriers prohibiting FFA Agriscience Fair participation. Findings from a qualitative study could help create professional development workshops to reduce the barriers. Preservice agricultural science teachers should be investigated to determine if they have developed the skills necessary to facilitate research.

Lastly, due to the low previous participation in the Kansas FFA Agriscience Fair, it is hard to see trends and reasoning why teachers participate in the Agriscience Fair. Replicating this study in a state with higher FFA Agriscience Fair participation and higher adoption of CASE could demonstrate possible correlations between curriculum and participation.

### References

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