

**Building Agricultural Mechanics Projects for Career Success**

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## **Introduction/Conceptual Framework**

School-based agricultural education programs (SBAEs) have been presented as an area to successfully integrate STEM concepts (Duncan, Ricketts, Peake, & Uessler, 2006). Agricultural mechanics courses, popular offerings since SBAEs foundation in the United States, contribute to supporting and delivering needed STEM integration (Anderson, Velez, & Anderson, 2014). The popularity of agricultural mechanics has continued to grow based on enrollment numbers and is second only to Principles of Agriculture, Food, and Natural Resources (PAFNR) in states like Texas (Texas Education Agency, 2018). Student supervised agriculture experiences (SAEs) are beneficial to state and local economies (Hanagriff, Rayfield, Briers, & Murphy, 2014).

Specifically, agricultural mechanics projects are an essential part of student SAE participation in Texas. It is estimated that the U.S. could experience a shortfall estimated at 875,000 individuals with skill sets in welding, machining, industrial machine operation, and other highly skilled manufacturing positions by 2020 (Sirkin, Zinser, & Rose, 2013). This study examines career interest of agricultural mechanics project show participants. The results of the study are potentially informative to career technical education administrators, stakeholders, and teachers.

Kolb's experiential learning model was used to guide the conceptual framework. Kolb (2014) indicated that experiential learning is the process of learning from life. The experiential learning model supports a constructivist approach to education where students build upon the knowledge and skills obtained in the classroom through lived experiences (Schunk, 2016).

## **Purpose/Objectives**

The purpose of this study was to describe student demographics, career, and educational goals of students participating in a major agricultural mechanics project show. This study supports the American Association for Agricultural Education's National Research Agenda (Roberts, Harder, and Brashears, 2016) Research Priority Area 3: Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21<sup>st</sup> Century.

## **Methods/Procedures**

The target population for this descriptive study was high school agricultural mechanics project show competitors. Data was collected at the San Antonio Stock Show and Rodeo Annual Agricultural Mechanics Project Show in the spring of 2017. Participants completed a researcher developed demographic survey. Six questions focused on general demographic information (ethnicity, gender, school size, etc.) with two additional questions related to: continuing education choice (college vs trade school or workforce) and what future career goals. 210 students participated at the event, with surveys collected from 140; resulting in a response rate of 67%. Non-response error was not an overt concern due to the descriptive nature of this study. As such, the results are applicable to the respondents and are not overly generalizable to the non-respondents.

Answers related to career goals were entered into SPSS and grouped based upon patterns within responses. The result was 17 career categories and an additional category for the response "*just make money*" ( $m = 6.4\%$ ). Following methods from Straus & Corbin (1990) open, axial and selective coding were used to create career intention categories. Additionally, these categories were cross checked by two faculty researchers to support validity of findings.

## Results/Findings

Objective 1 & 2 focused on describing the demographics, career and educational goals.. The typical respondent was male ( $n = 108$ , 76.6%), identified as white ( $n = 109$ , 77.3%), and was an upperclassmen ( $n = 99$ , 70.2%). Further, 54.6% of respondents reported attending a rural school ( $n = 77$ , 54.6%). Nearly 75% ( $n = 105$ ) of respondents indicated they intended to attend a four year college or university. The highest frequency of students (21, 15%), expressed interest in a career within metal fabrication/welding followed by engineering (14, 9.9%).

Objective 3 aimed to compare educational and career goals between demographic subsets of the sample. A majority of participants who identified as male intended to attend a college or university ( $n = 73$ , 67.6%), with 25% ( $n = 27$ ) of males planning to attend a trade school, and just 7.4% ( $n = 8$ ) planned to go straight to the workforce. The most commonly identified career goal for participants identifying as a male was metal fabrication/welder ( $n = 20$ , 18.5%). Participants who identified as female unanimously responded with intentions to attend a college or university ( $n = 30$ , 100%).

Among respondents who identified as white, 70.6% ( $n = 77$ ) planned to attend a college or university post-graduation; while 21.1% ( $n = 23$ ) planned to attend a trade school. The most commonly identified career goal for those participants who identified as white was metal fabrication/welder ( $n = 15$ , 13.8%). Of the participants who identified as Hispanic, the majority planned to attend a university post-graduation ( $n = 25$ , 89.3%), while 10.7% ( $n = 3$ ) planned to attend a trade school. The most commonly identified career goal for Hispanic participants was metal fabrication/welder and medical field ( $n = 5$ , 20%). Participants who reported attending a rural school were less likely ( $n = 51$ , 66.2%) to attend college or university than those respondents at an urban school ( $n = 30$ , 88.2%). Participants from rural ( $n = 10$ , 13.9%) or suburban ( $n = 7$ , 29.2%) schools identified a career interest in metal fabrication/welder.

## Conclusions

Students participating in agricultural mechanics project shows indicated a consistently high career interest in the area of metal fabrication and welding. An interesting finding was the high level of interest in the medical field among respondents who identified as Hispanic. We found that 31% indicated a career interest in an agriculture-related field (agricultural education/extension, agricultural sales, agricultural communications & animal science). Additionally, 44.6% of respondents reported a career interest relating specifically to curriculum contained in the National Career Content Standards pathway for agricultural mechanics (The National Council for Agricultural Education, 2015).

The results of this study provide important insight into the students participating in agricultural mechanics project shows. A continued concern of agricultural teacher shortages, specifically in the field of agricultural mechanics, as evidenced in the career interests of respondents in this study. Of the respondents who identified agricultural education as a career interest, a majority of respondents were female ( $n = 7$ , 70%). This supports the research on the changing demographic in agricultural education (Camp, 2001;Kantrovich, 2010; and Schultz, Anderson, Schultz and Paulsen, 2014).

## References

- Anderson, R., Velez, J., & Anderson, S. (2014). Using the Health Belief Model to Comparatively Examine the Welding Safety Beliefs of Postsecondary Agricultural Education Students and their Non-agricultural Education Peers. *Career & Technical Education Research*, 39(1), 9–22. <https://doi.org/10.5328/cter39.1.9>
- Camp, W. G. (2001). A national study of the supply and demand of teachers of agricultural education. Blacksburg, VA: Agricultural and Extension Education College of Agriculture and Life Sciences Virginia Polytechnic Institute and State University.
- Duncan, D. W., Ricketts, J. C., Peake, J. B., & Uessler, J. (2006). Teacher Preparation and In-Service Needs Of Georgia Agriculture Teachers. *Journal of Agricultural Education*, 24–35. <https://doi.org/10.5032/jae.2006.02024>
- Hanagriff, R. D., Rayfield, J., Briers, G., & Murphy, T. (2014). Economic Impacts and Program Involvement in Agricultural Mechanics Competition Projects in Texas. *Journal of Agricultural Education*, 55(2), 79–90.
- Kantrovich, A. J. (2010). 36th Volume - 2010 Supply Demand Study AFNR. Retrieved May 29, 2018, from <https://www.naae.org/teachag/2010%20AAAE%20Supply%20Demand%20Study.pdf>
- Kolb, David A. (2014). *Experiential learning: experience as the source of learning and development* (2nd ed.). Pearson Education.
- Roberts, T. G., Harder, A., & Brashears, M. T. (Eds). (2016). American Association for Agricultural Education national research agenda: 2016-2020. Gainesville, FL: Department of Agricultural Education and Communication.
- Schunk, Dale H. (7). (2016). *Learning Theories: An Educational Perspective*. The University of North Carolina at Greensboro: Pearson.
- Shultz, M. J., Anderson, R. G., Shultz, A. M., & Paulsen, T. H. (2014). Importance and Capability of Teaching Agricultural Mechanics as Perceived by Secondary Agricultural Educators. *Journal of Agricultural Education*, 55(2), 48-65. doi:10.5032/jae.2014.02048
- Sirkin, H. L., Zinser, M., & Rose, J. (2013). *Made in America, Again: The U.S. Skills Gap: Could it Threaten a Manufacturing Renaissance?*. The Boston Consulting Group.
- Texas Education Agency (2018). Total enrollment and teacher FTE counts by subject and course. *PEIMS Data 2017-2018*. Retrieved from <https://rptsvr1.tea.texas.gov/cgi/sas/broker>
- The National Council for Agricultural Education. (2015). *Agriculture, Food and Natural Resources (AFNR) Career Cluster: Content Standards*.