An Examination of the Agricultural Mechanics Professional Developmental Needs of 2016 National FFA Agricultural Technology and Mechanical Systems Career Development FFA Advisors

Introduction

- Across the U.S., agricultural mechanics curriculum exposes students to the application of knowledge and skills in real world situations (Parr, Edwards, and Leising 2008).
- Agricultural mechanics gives students hands on, educational learning opportunities that use a variety of technologies (Wells, Perry, Anderson, Shultz, & Paulsen, 2013).
- There is a shortage of agricultural science teachers, especially in high school agricultural education programs that offer agricultural mechanics courses (Wolf, 2011).
- The education of secondary agricultural students could be negatively affected by a shortage of qualified teachers who can instruct this unique curriculum area (Saucier, McKim, & Tummons, 2012).
- Agricultural mechanics curriculum can play a definitive roll in bridging the gap for entry level employees with pre-existing skill sets (Wells et al.).

Conceptual Framework

- The Borich Needs Assessment Model (Borich, 1980) guided this study
- Borich (1980) identified three dimensions within the needs assessment model that included: *Knowledge Competence*, *Performance Competence*, and *Consequence Competence*
- Furthermore, a comparison of scaled measures: importance, knowledge, ability to perform, and ability to teach others to perform, can be compared to create a Mean Weighted Discrepancy Score (MWDS)

Purpose and Research Questions

- The purpose of this census was to determine the agricultural mechanics professional development needs of FFA advisors who had a qualifying team at the 2016 National FFA Agricultural Technology and Mechanical Systems (ATMS) Career Development Event (CDE) and their personal, program, and professional demographics.

1. What are the demographic characteristics of these FFA Advisors?
2. What are the agricultural mechanics professional development needs of these FFA Advisors?

Knowledge Competency

Agricultural Mechanics Professional Development Needs of 2016 ATMS CDE Coaches (*n* = 40)

Rank	Skill Area	MWDS	Importance		Knowledge	
			M	*SD*	*M*	*SD*
1	Electricity	2.24	4.36	0.62	3.85	0.66
2	Gas Metal Arc Welding (GMAW)	1.80	4.38	0.70	4.00	0.75
3	Metal Fabrication	1.68	4.36	0.77	3.97	0.77
20	Hardfacing	-0.60	2.59	0.98	2.82	1.01
21	Soldering	-0.87	3.32	1.00	3.58	0.91
22	Painting and Preservation	-1.60	3.28	0.93	3.77	0.70

Performance Competence

Agricultural Mechanics Professional Development Needs of 2016 ATMS CDE Coaches (*n* = 40)

Rank	Skill Area	MWDS	Importance		Ability to Perform	
			M	*SD*	*M*	*SD*
1	Gas Metal Arc Welding (GMAW)	4.61	4.38	0.70	1.00	0.00
2	Electricity	2.12	4.36	0.62	3.87	0.82
3	Safety/Laboratory Management	1.69	4.95	0.22	4.61	0.54
20	Oxygen Fuel Cutting & Welding (OFCW)	-0.51	3.97	0.80	4.10	0.78
21	Soldering	-1.22	3.32	1.00	3.68	0.86
22	Painting and Preservation	-1.60	3.28	0.93	3.77	0.83

Consequence Competence

Agricultural Mechanics Professional Development Needs of 2016 ATMS CDE Coaches (*n* = 40)

Rank	Skill Area	MWDS	Importance		Ability to Perform	
			M	*SD*	*M*	*SD*
1	Electricity	2.35	4.36	0.62	3.82	0.75
2	Planning and Estimation	2.12	4.36	0.83	3.87	0.69
3	Metal Fabrication	2.01	4.36	0.77	3.90	0.90
20	Oxygen Fuel Cutting & Welding (OFCW)	- 0.41	3.97	0.80	4.08	0.80
21	Painting and Preservation	- 1.18	3.28	0.93	3.64	0.83
22	Soldering	- 1.22	3.32	1.00	3.68	0.86

Methods

- The population were all (*N* = 44) FFA advisors who had a qualifying team at the 2016 National FFA Agricultural Technology and Mechanical Systems (ATMS) Career Development Event (CDE)
- A census was conducted with usable responses received from 40 teachers (93.02%)
- The data collection instrument was developed based upon a review of literature
- Panel of experts review for face and content validity (*N* = 5)
- A pilot test (*n* = 19) was conducted with Texas agricultural science teachers who attended an agricultural mechanics professional development workshop during the fall 2016 semester.
- A reliability analysis (Cronbach's alpha coefficient) of the scales of measurement was conducted (Importance = .926, Knowledge = .930, Ability to Perform = .929, Ability to Teach Others to Perform = .936) and were deemed reliable (Ary, Jacobs, & Sorensen, 2010).
- Scaled data was analyzed using the Borich (1980) Needs Assessment Model, Microsoft Excel, and IBM SPSS Statistics 22.

Conclusions, Implications, Recommendations

- The majority of the white, male teachers were in their early 40's and had 18 years of teaching experience.
- These teachers taught in older agricultural mechanics laboratories, that were somewhat in usable and safe conditions, with budgets for all aspects of teaching agricultural mechanics
- Across all three-competence areas, teachers indicated a need for professional development
- The most frequent skill areas included: electricity, GMAW, and metal fabrication
- Implications from this research could be useful when assessing the overall ATMS CDE team score and using the teachers professional development needs as a predictor of success
- This study could also provide insight into the professional development needs of expert U.S. agricultural mechanics teachers and provide some upper echelon base line data.
- By understanding the knowledge, performance, and consequence competence of these teachers, adequate and timely professional development opportunities could be structured and offered

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