Examining the Impact of College-Level Agricultural Mechanical Courses

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Introduction

- Agricultural mechanical (ag mech) skills are important abilities that agricultural education teachers should possess (Blackburn, Robinson, & Field, 2015).

- Agricultural mechanical competence among agricultural educators is an important topic within the profession as it pertains to teacher preparation programs supplying competent educators.

Introduction (continued)

- Among all of the technical aptitudes acquired through undergraduate matriculation, ag mech continues to be one of the most examined components as it relates to:
  - Skill development (Thackston & Byrd, 2016)
  - Learner readiness (Blackburn et al., 2015)
  - Professional development (Saucier & McKim, 2011)
- Although previous research has been impactful regarding the need for improving ag mech competence, little research has been done to examine the impact that college-level ag mech preparation.

The Conundrum of Ag Mech Research

- In-service Level
  - Desire competent (ag mech) teachers
  - How can teachers improve their competency
- Pre-Service Level
  - College course cap (120hrs) vs ag mech course requirements
- This study sought to examine the impact of college-level ag mech courses on teacher ag mech competence.
- Specifically, what were the agricultural mechanical competencies of participants upon entering college and after exiting college?

Theoretical Framework

- Social cognitive and self-efficacy theories with a direct focus on teacher efficacy (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).
- Teacher Efficacy:
  - A teacher's belief in their capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context (Tshannen-Moran et al., 1998).
- Little research teacher efficacy as it relates to an individuals' drive to persevere when faced with obstacles, and their desire to exert effort in acquiring the information needed to become successful (Whittington, McConnell, & Knobloch, 2006).

Methodology

- This study utilized descriptive explanatory research.
- Target population: high school agricultural education teachers in Areas V, VI, and VIII as identified by the Texas FFA Organization (N = 700).
- Using a sampling formula, researchers randomly selected 150 teachers (*n* = 150).
- The questionnaire was developed by the researchers with some questions being modeled after the Rice, LaVergne, & Gartin, (2011) study.

Methodology (continued)

- Questionnaire focused on assessing 10 agricultural mechanical competencies based on a 4-point Likert scale:
  - 1.00 -1.50 = *no skills*
  - 1.51-2.50 = *minimal skills*
  - 2.51-3.50 = *basic skills*
  - 3.51- 4.00 = *advanced skills*
- A panel of experts with agricultural mechanics teaching experience established content and face validity.
- Survey implementation and data collection methods followed Dillman's (2009) *Tailored Designed* Method.

Methodology (continued)

- Non-response error: early *vs* late respondents. No statistically significant differences were found.
- A response rate of 67% was attained (n = 101).
- To determine if a statistically significant (p <.05) relationships existed, paired-samples t-test was utilized.
- Effect sizes were calculated, interpreted, and reported (Cohen, 1988).

.01	Small Effect
.06	Medium Effect
.14	Large Effect

Findings (*n* =101)

	Ag Mech Skill	*M*	*SD*	*t*	*p*	Cohen's *d*
Pair 1	Agriculture Buildings & Structures	2.79 3.14	.74 .75	5.74	.001	.29
Pair 2	Cold Metal Work	2.58 2.96	.93 .86	5.86	.001	.26
Pair 3	Concrete & Masonry	2.35 2.84	.81 .72	8.63	.001	.43
Pair 4	Electrical Principles	2.38 2.99	.84 .83	9.53	.001	.48
Pair 5	Hydraulics	1.87 2.27	.88 .96	6.81	.001	.32
Pair 6	Metal Fabrication	2.75 3.21	.85 .86	7.14	.001	.34
Pair 7	Plumbing	2.53 2.95	.83 .90	5.77	.001	.25
Pair 8	Small Gas Engines	2.35 2.95	.92 .92	8.75	.001	.43
Pair 9	Welding	2.92 3.36	.80 .76	6.40	.001	.29
Pair 10	Woodworking	2.85 3.17	.82 .78	5.47	.001	.23

Conclusions/Implications

- A statistically significant increase across all agricultural mechanical competencies was observed.
- Implication: Enrolling in ag mech courses during post secondary matriculation = greater competency
- The eta squared statistic (Cohen's d) indicated a large effect size for each competency.
- Implication: Increases the probability that the observed change (magnitude) really exist.

Recommendations

- Teacher preparation programs should encourage preservice educators to take ag mech courses early and often during their college matriculation.

- In terms of increasing participants'' ag mech skills into another competency, future research should examine the perceived barriers of developing total competency.

Findings (*n* =101)

	Ag Mech Skill	*M*	*Competence Level*		
Pair 1	Agriculture Buildings & Structures	2.79 3.14	Basic Basic		
Pair 2	Cold Metal Work	2.58 2.96	Basic Basic		
Pair 3	Concrete & Masonry	2.35 2.84	Minimal Basic		
Pair 4	Electrical Principles	2.38 2.99	Minimal Basic		
Pair 5	Hydraulics	1.87 2.27	Minimal Minimal		
Pair 6	Metal Fabrication	2.75 3.21	Basic Basic		
Pair 7	Plumbing	2.53 2.95	Basic Basic		
Pair 8	Small Gas Engines	2.35 2.95	Minimal Basic		
Pair 9	Welding	2.92 3.36	Basic Basic		
Pair 10	Woodworking	2.85 3.17	Basic Basic		

Recommendations

- Additional research should be conducted with agricultural education teachers to examine the context of college-level ag mech courses compared to the secondary curriculum.

- Additional research focusing on high school ag mech skill development. Are our high schools preparing competent students??

- Thank You!