

Does the Number of Post-secondary Agricultural Mechanics Courses Completed Affect Teacher Competence?

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Introduction

- Creating a teacher-education program to prepare secondary agricultural educators is a difficult task, but is not a new issue (McCulloch, Burris, & Ulmer, 2011).
- AAEE National standards for teacher-education states that “programs must be designed to allow teacher candidates to attain competence in basic principles, concepts, and experiential practices”
- Keeping curriculum content areas up to date is difficult when one examines the subject areas an agricultural education teacher must know in order to teach effectively.



Introduction

- One such area is agricultural and mechanical systems as stated by the AAEE teacher standards.
- Numerous studies have examined the professional development needs agricultural mechanics (Fletcher & Miller, 1995; Lester, 2012; McKim, Saucier, & Reynolds, 2010; Peake, Duncan, Ricketts, 2007; Saucier & McKim, 2010; Schlautman & Silletto, 1992; Washburn, King, Garton, & Harbsteit, 2001).
- Hubert and Leising (2000) stated that “teacher knowledge of agricultural mechanics was in need of improvement both prior to and after accepting teaching positions” (p. 24).



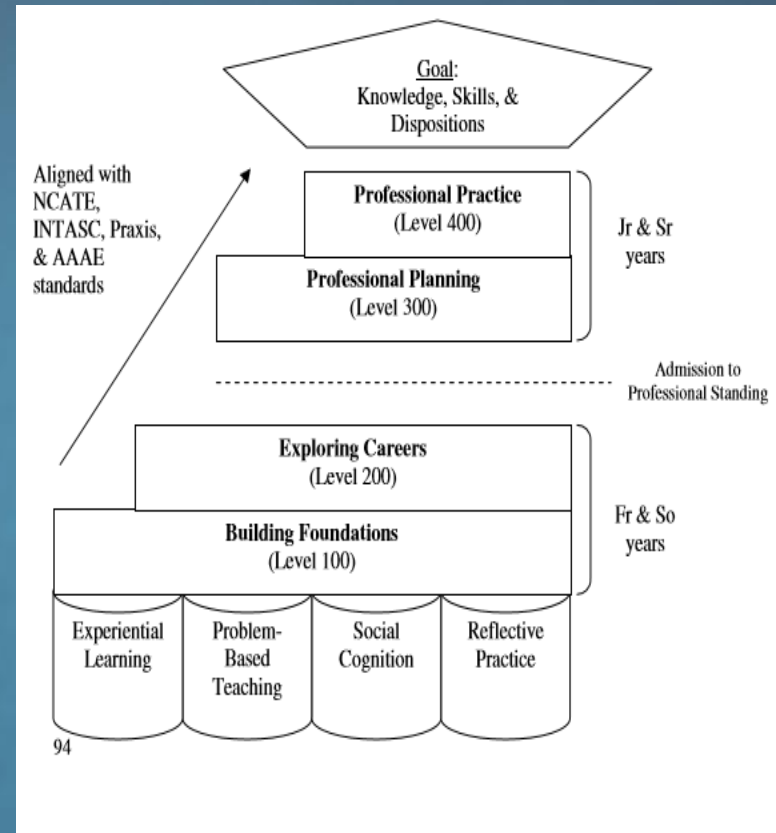
National Requirements

- Average GPA to enter into teacher education: 2.5 (Conners & Mundt, 2001)
- Average technical agricultural credits: 43.44; agricultural education credits: 26.22; science credits: 14.52; general education credits: 34.64; Total average credits to graduate: 128.76
- Burris, Robinson, and Terry (2005) found that the requirements for agricultural mechanics ranged from 0 – 20 credits, with an average of 5 – 8 credits.
- Does the agricultural mechanics curriculum requirement give adequate time for pre-service teachers to develop essential skills to become competent enough to teach?



Conceptual Framework

- The model for teacher preparation in agricultural education (Whittington, 2005) served as the conceptual framework for this study.
- The researchers specifically considered the building foundations portion of the model.



Purpose and Objectives

- The purpose of this study was to describe the perceptions of secondary agricultural education teachers concerning their competence teaching selected agricultural mechanics skills based on the number of different college courses taken.
 1. Describe self-perceived competency of secondary agricultural education teachers in teaching agricultural mechanic skills.
 2. Describe the number of post-secondary agricultural mechanics courses completed by Iowa agricultural education teachers.
 3. Describe the relationship between teacher competence and the number of post-secondary courses taken in agricultural mechanics at a two and four year college.



Methods

- Descriptive study using survey research methods.
- Researcher-modified, paper-based questionnaire was used to address the objectives of the study.
- Content validity was determined by a panel of experts in agricultural mechanics and agricultural education.
- Pilot-tested in a nearby state, which led to the adoption of a paper-based survey instead of an electronic version.
- Post-hoc reliability was estimated following the suggestions of Gliem and Gliem (2003) and resulted in reliability coefficients for competency ($\alpha = 0.98$).



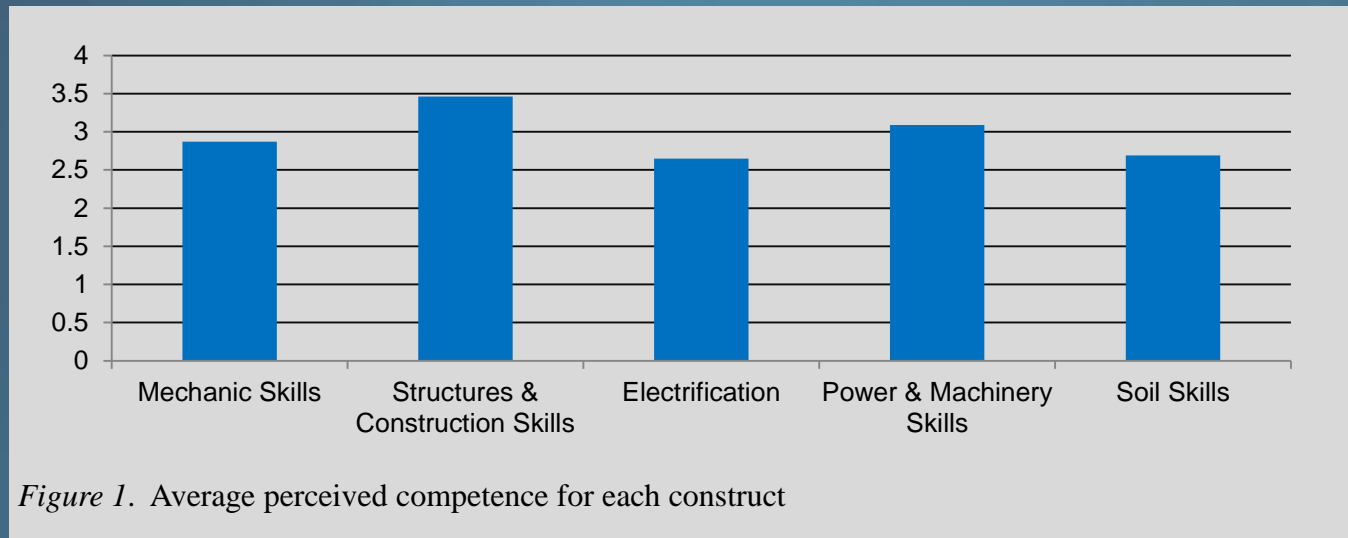
Methods

- Census study consisting of agricultural educators that participated in the 2011 Iowa agricultural education teachers' conference. ($N=130$)
- 103 usable instruments were returned yielding a 79.2% response rate.
- Non-response error was addressed by comparing respondents' data to the Iowa Department of Education, which yielded no significant differences



Results

- Objective 1 – Describe perceived competence



Results

- Objective 2 – Describe the amount of post-secondary courses taken
- ~35% had ZERO courses
- ~29% only had one course
- ~36% ranged from 2–13 courses

Number of Post-Secondary Agricultural Mechanics Courses Completed by Iowa agricultural education teachers (n=103)

# of Courses Completed	<i>f</i>	%
0	36	34.95
1	30	29.13
2	9	8.74
3	9	8.74
4	7	6.80
5	2	1.94
6	6	5.83
9	1	0.97
10	2	1.94
13	1	0.97

Results

- Objective 3 – Describe the relationship between the number of courses taken and the perceived competence.

- Critical Value for χ^2
 - 9.49

- Cramer's V effect size
 - Medium (0.21)
 - Large (0.35)

Effect Size between Teacher Competence and College Courses Taken, 2011. $p < .05$

Competency Area	<i>n</i>	<i>M</i>	<i>SD</i>	χ^2	<i>V</i>
Cleaning Motors	81	2.35	1.02	16.69	0.32
Legal Land Descriptions	93	3.39	1.20	18.94	0.32
Electrical Safety	88	3.08	1.32	16.76	0.31
Pipe Cut & Thread	82	2.49	1.14	14.4	0.29
Small Engine – 4 cycle	90	3.27	1.19	15.06	0.29
Wiring Skills	91	2.98	1.28	14.72	0.28
Use of Survey Equipment	90	2.67	1.06	14.51	0.28
Oxy-Acetylene Brazing	91	2.81	1.22	14.32	0.28
Oxy-Acetylene Cutting	99	3.51	1.09	15.44	0.27
Oxy-Acetylene Welding	99	3.25	1.11	14.88	0.27
Cold Metal Work	84	2.36	1.01	12.48	0.27
Small Engine Safety	90	3.37	1.23	12.49	0.26
Electrician Tools	90	2.89	1.27	12.13	0.26
Small Engines Overhaul	88	3.14	1.24	10.37	0.24
Tool Conditioning	83	2.52	1.07	9.50	0.24
GMAW Welding (Mig)	96	3.51	1.17	9.53	0.22

Conclusions

- Objective 1:
 - Iowa agricultural educators perceive themselves to be the most competent in structures and construction skills.
 - Lester (2012) also found Arizona agricultural education teachers had a high perceived competence in the same content area.
 - Conversely, Peake, Duncan, and Ricketts (2007) found Georgia agricultural education teachers had a low competence in this area.



Conclusions

- Objective 2:
 - 64% of teachers indicated they had 0 to 1 courses in agricultural mechanics, which falls below the national average of 5-8 credits.
 - Are these teachers getting enough agricultural mechanics knowledge in their pre-service programs?
 - 36% of teachers indicated they took 2-13 courses.
 - The wide range indicated could be due to older professionals that were on the quarter system in college.



Conclusions

- Objective 3:
 - The 16 skills that had a statistically significant relationship are areas that teachers need more time/courses to gain competence to teach the areas effectively.
 - The content areas include small engines, electricity, Oxy-Acetylene work, cold metal work, surveying, and GMAW welding



Recommendations

- To examine current curricula in teacher preparation program to determine the amount of time spent on the specific content areas that were found statistically significant.
- Using the content areas from objective 3, create professional development opportunities for agricultural educators.
- For those wanting to replicate the study, review and possibly modify the instrument to increase the number and quality of responses.



Thank You!

- Questions???

