

Laboratory Management Professional Development Needs of Iowa Secondary Agricultural Education Teachers

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Introduction

- McKim and Saucier (2013) found over a 20 year period that agricultural education instructors were receiving less training in agricultural mechanics, students had less working space, and had increased student enrollment in the agricultural mechanics programs.
- Agricultural laboratories are an essential component of the total secondary agricultural education program and allow students to actively engage in scientific inquiry and application (Phipps, Osborne, Dyer, & Ball, 2008; Osborne & Dyer, 2000)
- Administrators rely on knowledgeable agriculture teachers to provide high-quality instruction in a safe environment for school age students (Dyer & Andreassen, 1999; Gliem & Miller, 1993; McKim & Saucier, 2011b)
- Parents demand that their children receive safe and proper instruction, with adequate supervision, from qualified individuals (Dyer & Andreassen, 1999)
- Safety is the single most important consideration when teaching in a laboratory environment (Dyer & Andreassen, 1999), and is the primary responsibility of the teacher (Gliem & Miller, 1993)
- Knowledge and skills associated with agricultural mechanics education are essential for teachers who intend to provide a safe and efficient laboratory learning environment for secondary agricultural education students (Saucier, Terry, & Schumacher, 2009)
- Agricultural mechanics courses continued to be a popular school-based agricultural education course offered (R. Anderson, personal communication, January 13, 2016)
- The *National Research Agenda, Research Priority Area 3*, suggested that teachers “have broad cognitive and affective skills” (National Research Council, 2011) in addition to “both academic and technical skills” in-order to be career ready (Roberts, Harder, & Brashers, 2016).

Conceptual/ Theoretical Framework

- Bandura’s theory of self-efficacy (1997)
- Borich’s Needs Assessment Model (1980)

Mean Weighted Discrepancy Score (MWDS) =
$$\frac{[(\text{Importance Rating} - \text{Ability Rating}) \times (M \text{ Importance Rating})]}{\text{Number of Observations}}$$

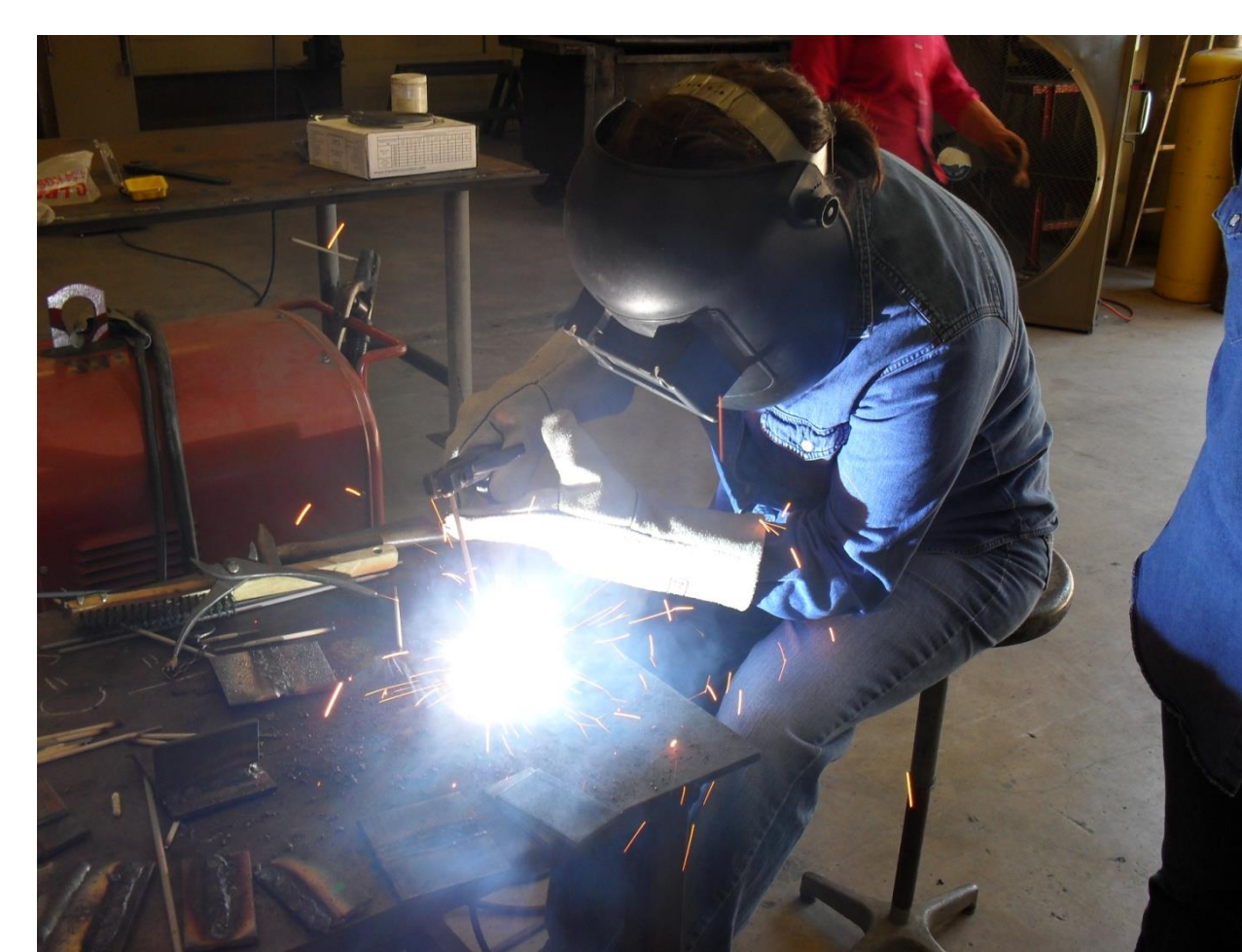
* The greater the MWDS indicates the greater need for professional development

Purpose and Research Question

- The purpose of this study was to identify the laboratory management professional development needs of Iowa school-based agricultural educators who manage and teach within an agricultural mechanics laboratory.
- What are the agricultural mechanics laboratory management professional development needs of Iowa agriculture teachers?

Results

Competencies	MWDS
Top 5	
Correcting hazardous laboratory conditions	5.00
Safely disposing of hazardous materials	4.39
Properly installing and maintaining safety devices and emergency equipment	4.31
Safely handling hazardous materials	0.87
Safely storing hazardous materials	2.92
Bottom 5	
Implementing student recruitment activities for the agricultural mechanics program	0.36
Conducting an agricultural mechanics public relations program	0.27
Maintaining a file of educational projects/activities for students	0.26
Planning student recruitment activities for the agricultural mechanics program	0.15
Maintaining computer based student academic records	-0.22



Methodology

- Population: Iowa school-based agricultural educators (N = 238)
- Random sample utilized (n = 148; Krejcie & Morgan, 1970)
- Validity and reliability established through factor analysis (McKim & Saucier, 2011a); 33 competencies and 8 constructs
- Web-based and paper instrument used with five points of contact (Dillman, 2007); response rate of (n = 62) 41.89%
- Test for non-response error was not significant (Lindner, Murphy, & Briers, 2001, Method 2); results were generalizable to remaining population
- Data analyzed using IBM SPSS Statistics 22.0 and Microsoft Excel ® based MWDS calculator (McKim & Saucier, 2011c)

Conclusions

- Teachers indicated that they had professional development needs across all 8 constructs and for all 33 competencies
- Most needed competences were in the area of laboratory safety and student laboratory instruction
- Top needed PD competency, *Safely disposing of hazardous materials*
- Least need PD competency, *Maintaining computer based student academic records*

Implications

- What courses are required for certification for early career school-based agriculture teachers in Iowa?
- Does the curriculum found within these courses prepare teachers to instruct the school-based agricultural mechanics curriculum found in Iowa public schools?
- Are professional development opportunities in this area of the curriculum offered to school-based teachers? If not, what is Iowa’s plan to improve teachers efficacy and knowledge in the realm of agricultural mechanics?

Recommendations

- A comprehensive, pre-service/ continuing education program in Iowa should be developed in for teachers in the area of agricultural mechanics laboratory management
- Develop a mentor/ mentee program to aid in the safe management and use of agricultural mechanics laboratories
- Periodic and timely inspections by state staff to address safety issues that may be present in schools

References

- Available upon request