Agricultural Education Pre-Service Teachers' Perceived Competence in an Advanced Agricultural Mechanics Course

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Introduction

Secondary Agricultural Education

- ✓ Variety of technical areas
  - ✓ Animal Science
  - ✓ Plant Science
  - ✓ Environmental/Natural Resources
  - ✓ Youth Leadership/FFA
  - ✓ Agricultural Mechanics

Introduction

Agricultural Mechanics

- ✓ Variety of technical areas
  - ✓ Welding
  - ✓ Gas/diesel engines
  - ✓ Woodworking/construction
  - ✓ Electrical wiring
  - ✓ Concrete/Masonry
  - ✓ Plumbing
  - ✓ Land Surveying

Introduction

Pre-service Candidates

- ✓ Need to be prepared to teach effectively, and safely in all of these areas (PDE, 2015).
- ✓ Preparation in such a diverse number of areas can be difficult (Byrd, Anderson, Paulsen, & Shultz, 2015).
- ✓ Often cite agricultural mechanics to be an area of low competence (Saucier & McKim, 2011).

Theoretical Framework

- ✓ Bandura's Self-efficacy theory (Bandura, 1997).
  - ✓ Connects an individual's belief in their ability to a task or action, and future choices of that individual regarding that task.
  - ✓ Pre-service teacher competence can be examined through this lens.
- ✓ Experiences provided can be examined to gather perceptions of students' self-efficacy.

Purpose

Determine:

- ✓ Pre-service teacher candidates' perceived level of competence in agricultural mechanics.

Objective

Determine:

- ✓ The perceived change in competence of twelve instructional areas from the beginning of a course to the end of that course.

Methods

- ✓ Population – Eleven students enrolled in advanced-level agricultural mechanics course (prior to student teaching).

- ✓ Survey instrument
  - ✓ Administered on first day of class and then following completion of the course.
  - ✓ Fifty-eight Likert-type items
  - ✓ Scale (1 = Not Competent to 10 = Very Competent).

Methods

- ✓ Twelve instructional areas
  - ✓ Laboratory Management/Safety
  - ✓ Cold Metal Work
  - ✓ Power Tools
  - ✓ Hand Tools
  - ✓ Wood Construction
  - ✓ ARC Welding
  - ✓ Oxy-fuel Cutting and Welding
  - ✓ Plasma Arc Cutting
  - ✓ General Project Construction
  - ✓ Plumbing
  - ✓ Small Gas Engines
  - ✓ Concrete/Masonry

Methods

- ✓ Data were entered into Excel and means were calculated for each of the competency areas (Pre-test and Post-test).
- ✓ Comparison of the means (Pre-test to Post-test) were conducted.

Results

Pre-Test Competency Means

- ✓ Cold Metal Work (2.98)
- ✓ Oxy-fuel Cutting and Welding (4.60)
- ✓ Plasma Arc Cutting (4.82)
- ✓ ARC Welding (5.09)
- ✓ Plumbing (5.25)
- ✓ Small Gas Engines (5.39)
- ✓ Concrete/Masonry (5.61)
- ✓ Wood Construction (5.98)
- ✓ General Project Construction (6.18)
- ✓ Laboratory Management/Safety (6.71)
- ✓ Power Tools (7.18)
- ✓ Hand Tools (7.43)

Results

Post-Test Competency Means

- ✓ Cold Metal Work (5.84)
- ✓ Small Gas Engines (6.29)
- ✓ ARC Welding (6.86)
- ✓ Oxy-fuel Cutting and Welding (7.00)
- ✓ Concrete/Masonry (7.09)
- ✓ Plasma Arc Cutting (7.27)
- ✓ General Project Construction (8.12)
- ✓ Plumbing (8.12)
- ✓ Wood Construction (8.18)
- ✓ Laboratory Management/Safety (8.62)
- ✓ Power Tools (8.72)
- ✓ Hand Tools (8.75)

Results

Pre-Test/Post-Test Comparison

- ✓ Cold Metal Work (2.98)
- ✓ Oxy-fuel Cutting and Welding (4.60)
- ✓ Plasma Arc Cutting (4.82)
- ✓ ARC Welding (5.09)
- ✓ Plumbing (5.25)
- ✓ Small Gas Engines (5.39)
- ✓ Concrete/Masonry (5.61)
- ✓ Wood Construction (5.98)
- ✓ General Project Construction (6.18)
- ✓ Laboratory Management/Safety (6.71)
- ✓ Power Tools (7.18)
- ✓ Hand Tools (7.43)

- ✓ Cold Metal Work (5.84)
- ✓ Small Gas Engines (6.29)
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- ✓ Oxy-fuel Cutting and Welding (7.00)
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- ✓ Plasma Arc Cutting (7.27)
- ✓ General Project Construction (8.12)
- ✓ Plumbing (8.12)
- ✓ Wood Construction (8.18)
- ✓ Laboratory Management/Safety (8.62)
- ✓ Power Tools (8.72)
- ✓ Hand Tools (8.75)

Results

Pre-Test/Post-Test Comparison

- ✓ Plumbing (2.87)
- ✓ Cold Metal Work (2.86)
- ✓ Plasma Arc Cutting (2.45)
- ✓ Oxy-fuel Cutting and Welding (2.40)
- ✓ Wood Construction (2.20)
- ✓ General Project Construction (1.94)
- ✓ Laboratory Management/Safety (1.91)
- ✓ ARC Welding (1.77)
- ✓ Power Tools (1.54)
- ✓ Concrete/Masonry (1.48)
- ✓ Hand Tools (1.32)
- ✓ Small Gas Engines (.09)

Conclusions

- ✓ Overall, competency levels increased for each of the twelve areas.
- ✓ Areas where students had higher perceived competence prior to the course, remained high following the course.
- ✓ Areas where students had low perceived competence prior to the course, remained low in comparison to other areas.

Recommendations

- ✓ Teacher education faculty should further examine;
  - ✓ Lowest areas of perceived growth
  - ✓ Lowest post-mean scores
- ✓ Opportunities can be developed to increase perceived competency through;
  - ✓ Course changes
  - ✓ Structured opportunities outside out of class
  - ✓ Promotion of internship/work experience opportunities related to agricultural mechanics

Recommendations

- ✓ Upcoming professional development in agricultural mechanics should be designed around the current findings.
- ✓ Teacher educators should examine other program areas in a similar fashion.
  - ✓ Animal Science
  - ✓ Plant Science
  - ✓ Environmental/Natural Resources
  - ✓ Youth Leadership/FFA
  - ✓ Agricultural Mechanics
- ✓ The findings from such research could support similar professional development structure for the new and beginning teachers of Pennsylvania.

Implications

- ✓ This study has implications for:
  - ✓ Current course structure/content.
  - ✓ Providing/helping students seek out opportunities for growth in these content areas to fill gaps in knowledge/skills.
  - ✓ Professional development of teachers in the state (content, as well as structure).

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Thank you!