Yearlong Involvement with the Curriculum for Agricultural Science Education: A High School Student Perspective

Misty D. Lambert
Jonathan J. Velez
Kristopher M. Elliott

Introduction

• The Curriculum for Agricultural Science Education (CASE) is a new, rapidly growing curriculum that purports to enhance the academic rigor of agricultural education at the high school level
• Because it is a new program, very little research exists which examines the impact or perceptions of the participants
• This study sought to take a broad look at the perceptions of students engaged in a yearlong Curriculum for Agricultural Science Education curriculum
Need

- A rigorous, science-based high school agriculture curriculum may improve our ability, on the college level, to recruit and retain high achieving agriculture students.
- The Association of Public Land Grant Universities’ Science & Mathematics Teacher Imperative calls for an increased emphasis on STEM related middle and high school education.
- The National Research Council 2009 report, Transforming Agricultural Education for a Changing World, recommended an increased focus on K-12 education.

Conceptual Framework

Grounded in the Person-object Theory of Interest (POI) [Krapp & Fink, 1992]

- The POI focusses on both cognitive and affective aspects of interest

Study examined 5 constructs:

- Critical Thinking
- Task Value
- Autonomy
- Science Lab Self-efficacy
- Cognitive Engagement
Purpose

• Identify the demographic characteristics of students enrolled in CASE courses.
• Identify the means of the constructs of interest for the first, second, and third points of assessment during the yearlong CASE experience.

Methods

• Purposive sample of 4 area high schools (Ary, Jacobs, Razavieh, & Sorensen, 2006)
  • One rural, two large suburban, and one large urban school
  • Results are generalizable only to the respondents

• Researchers conducted assessments in yearlong CASE courses
  • Assessed in September, December, and May
Instrumentation

• All Likert-type instruments, scaled from 1 (strongly disagree) to 6 (strongly agree)

• Critical Thinking
  – Motivated Strategies for Learning Questionnaire (MSLQ) (α = .72-.75) (Pintrich, Smith, Garcia, & McKeachie, 1991)

• Task Value
  – MSLQ (α = .86-.89)

• Autonomy
  – Learning Climate Questionnaire (LCQ) (α = .88-.90) (Deci et al., 1991)

• Science Self-efficacy
  – Science Self-efficacy (α = .86-.90) (Britner, 2000)

• Cognitive Engagement
  – Motivated Task statements (α = .89-.91) (Greene et al., 2004)

Results: Obj. 1

• Total of 353 respondents from four schools
  • Two larger schools with CASE enrollments of 125 and 136
  • Two smaller schools with enrollments of 69 and 23

• Course enrollments
  ➢ Introduction to Agriculture, Food, and Natural Resources – 87
  ➢ Principles of Agricultural Science (Animal) – 59
  ➢ Principles of Agricultural Sciences (Plant) – 207

• Demographic data provided by the course instructors
Results: Obj. 1

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (n = 315)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>160</td>
<td>45.19</td>
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<tr>
<td>Female</td>
<td>155</td>
<td>43.78</td>
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<td>Grade level (n = 315)</td>
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<tr>
<td>Freshman</td>
<td>70</td>
<td>22.59</td>
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<tr>
<td>Sophomore</td>
<td>70</td>
<td>19.77</td>
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<td>Junior</td>
<td>95</td>
<td>26.83</td>
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<tr>
<td>Senior</td>
<td>80</td>
<td>22.59</td>
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<td>IEP (n = 315)</td>
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<td>15.27</td>
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<tr>
<td>No</td>
<td>268</td>
<td>75.70</td>
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<tr>
<td>TAG (n = 315)</td>
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<tr>
<td>No</td>
<td>300</td>
<td>95.25</td>
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<td>ELL (n = 315)</td>
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<td>12.70</td>
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<td>87.30</td>
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<td>A participant in FFA (n = 315)</td>
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<td>Yes</td>
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<td>37.70</td>
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<tr>
<td>No</td>
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<td>62.30</td>
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<tr>
<td>Science credit (n = 315)</td>
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<td>73.50</td>
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<tr>
<td>No</td>
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<td>26.50</td>
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<tr>
<td>College credit (n = 315)</td>
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<tr>
<td>No</td>
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<td>93.00</td>
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Results: Obj. 2

Student Perceptions of Autonomy, Task Value, and Critical Thinking (n = 173)
Results: Obj. 2

Student Perceptions of Science Efficacy and Cognitive Engagement (n = 173)

<table>
<thead>
<tr>
<th>Ordinal Variable</th>
<th>Interval Variable</th>
<th>Value</th>
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<tbody>
<tr>
<td>Grade Level</td>
<td>X Autonomy</td>
<td>.12^b</td>
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<tr>
<td></td>
<td>X Task Value</td>
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<tr>
<td></td>
<td>X Critical Thinking</td>
<td>-.06^a</td>
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<tr>
<td></td>
<td>X Science Efficacy</td>
<td>.02^a</td>
</tr>
<tr>
<td></td>
<td>X Cognitive Engagement</td>
<td>.02^a</td>
</tr>
</tbody>
</table>

Note. All correlations and effect sizes are less than r = .20 (<.04). Grade level was coded 1 = Freshman, 2 = Sophomore, 3 = Junior, 4 = Senior
^a trivial, ^b small
**Results: Obj. 3**

*Point-biserial correlations between dichotomous nominal and interval variables (n = 173)*

<table>
<thead>
<tr>
<th></th>
<th>Autonomy</th>
<th>Task Value</th>
<th>Critical Thinking</th>
<th>Science Efficacy</th>
<th>Cognitive Engagement</th>
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<tbody>
<tr>
<td>Gender</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>$r_{pb}$</td>
<td>-.25*</td>
<td>-.21*</td>
<td>-.08</td>
<td>-.15*</td>
</tr>
<tr>
<td>Sig.</td>
<td></td>
<td>.00</td>
<td>.00</td>
<td>.25</td>
<td>.04</td>
</tr>
</tbody>
</table>

|        |          |            |                   |                  |                     |
|        | $r_{pb}$ | -.12       | -.10              | -.04             | .19*                |
| Sig.   |          | .18        | .21               | .61              | .01                 |

|        |          |            |                   |                  |                     |
|        | $r_{pb}$ | .08        | .00               | -.04             | .00                 |
| Sig.   |          | .30        | .96               | .63              | .98                 |

|        |          |            |                   |                  |                     |
|        | $r_{pb}$ | .21*       | -.24*             | -.10             | -.19*               |
| Sig.   |          | .00        | .00               | .18              | .01                 |

|        |          |            |                   |                  |                     |
|        | $r_{pb}$ | .15        | .12               | .15*             | .08                 |
| Sig.   |          | .05        | .10               | .05              | .29                 |

|        |          |            |                   |                  |                     |
|        | $r_{pb}$ | .25*       | .21*              | .15              | .24*                |
| Sig.   |          | .00        | .00               | .05              | .00                 |

|        |          |            |                   |                  |                     |
|        | $r_{pb}$ | .16*       | .00               | -.06             | .02                 |
| Sig.   |          | .04        | .93               | .47              | .82                 |

**Note.** All effect size descriptors for statistically significant correlations fall within the small (.10-.30) designation. All dichotomous variables were coded 0 = no, 1 = yes. Gender was coded 0 = females, 1 = males. *Correlation is significant at the 0.05 level (2-tailed).

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**Conclusions**

- No statistically significant mean differences between the three points of assessment
- Context specific
  - Two schools showed slight gains
  - Two schools showed slight decreases
- Students active in FFA perceive themselves to be “engaged” in their CASE curriculum
- Females perceived themselves as higher in all construct areas
- ELL students evidenced lower mean scores in all construct areas
Recommendations

• Further research with controls for some of the extraneous variables
• Experimental design with assessment of academic scores
• Research which examines the perceptions of ELL and IEP students actively involved in a CASE course
• Longitudinal studies which track future enrollment in post-secondary agriculture enrollment

Thank You

Misty Lambert
Assistant Professor
Oregon State University
Misty.Lambert@OregonState.edu