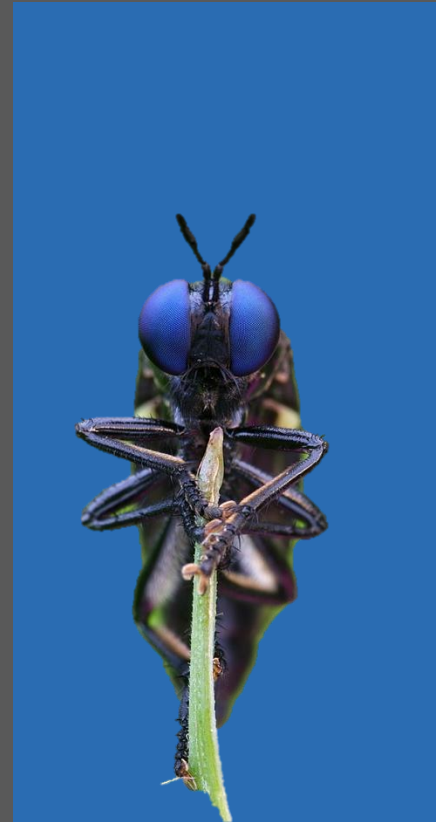


The Impact of a Multi-institution Case Study Course on Entomology Students' Argumentation Skills related to Integrated Pest Management Decisions

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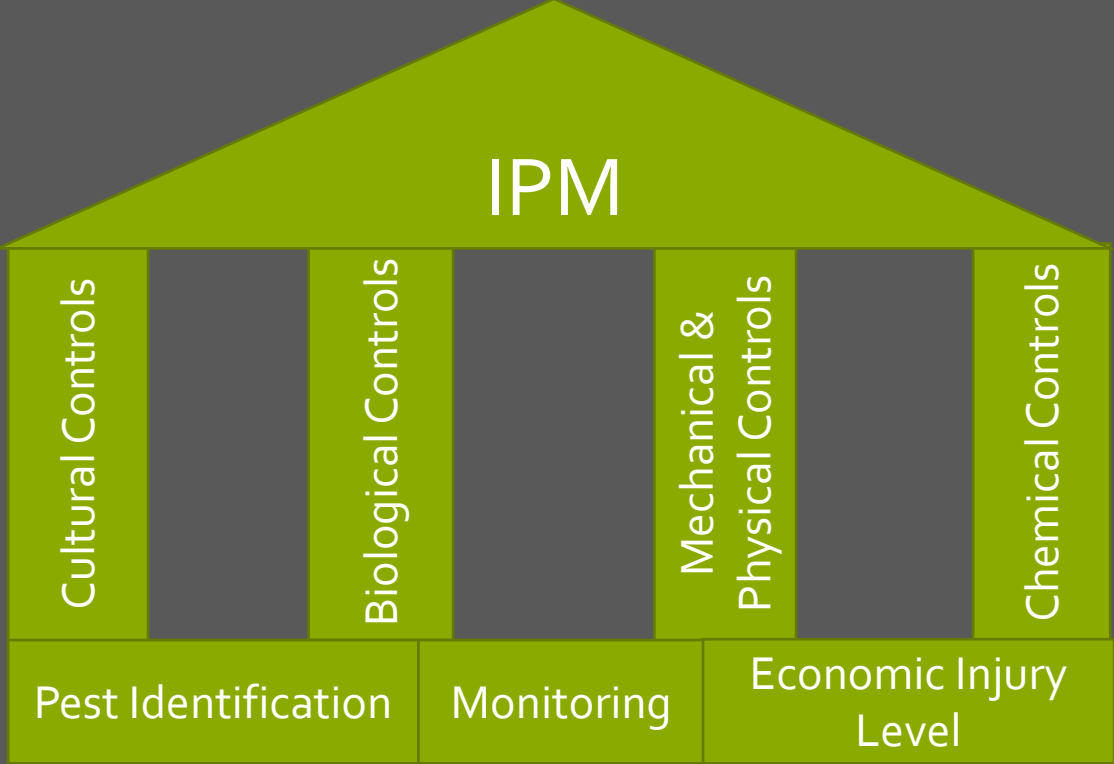


IPM Industry Trends

- Accepted strategy for plant protection world-wide (Penshin, Bandral, Zhang, Wilson, & Dhawan, 2009)
- Widespread growth in IPM adoption over last 40 years (Maupin & Norton, 2010)
 - Consumer demand
 - Food processor encouragement
- IPM use yields greater biodiversity and reduces pesticide use by at least 20% (Freier & Boller, 2009)



Foundations and Structure
of an IPM Program



Educational Needs

- Pest control identified as one of the top 10 educational need areas of women farmers in Pennsylvania (Brasier, et al. 2009)
- Iowa State Graduates were perceived as being more skilled at pesticide application than insect identification (VanDerZanden & Reinert, 2009)
- Washington nurseries indicated insufficient understanding of the value of species diversity in controlling pest outbreaks (Polakowski, Lohr, & Cerny-Koenig, 2011)
- College students had least knowledge on integrated pest management (Sitienei & Morrish, 2014)





Resident Education Participation

The two classes (Advanced Applied Entomology) that will be taught simultaneously and linked via distance education technology in Spring 2015 are listed as ENTO 4133 at the University of Arkansas and ENT 574 at the University of Kentucky. Both courses are designed for graduate students and upper-level undergraduates, and are appropriate for analysis and discussion of issues and case histories, rather than delivery of textbook information (*delivered in pre-requisite courses*). We will develop and deliver the content of this course using case histories to illustrate key concepts and principles of integrated pest management (IPM). The case-history studies will provide examples of application (or mis-application) of IPM in a range of pest management systems. Most of the course will be based on readings, student presentations, discussion, and debates. Our plan is to propose and encourage collaborative teams of students from both institutions, which will enhance the opportunities for students to work with their peers from the other university. We will design assignments, similar to requests for multidisciplinary proposals that give maximum credit for collaborative work in teams from both institutions.



Objectives

- Determine course's impact on students' number and quality of arguments when supporting IPM decisions
- Describe students' perceptions regarding course's influence on their decision making and argumentation skills related to IPM



Methods

- **Mixed Methods:**

- **Single group, pretest-posttest:**

- Case-based, open-response scenarios and Argumentation Quality Rubric (Sadler & Fowler, 2006)
- Number and quality of arguments
- Mean difference

- **Focus group:**

- Students' perceptions about the course and its impact on IPM knowledge

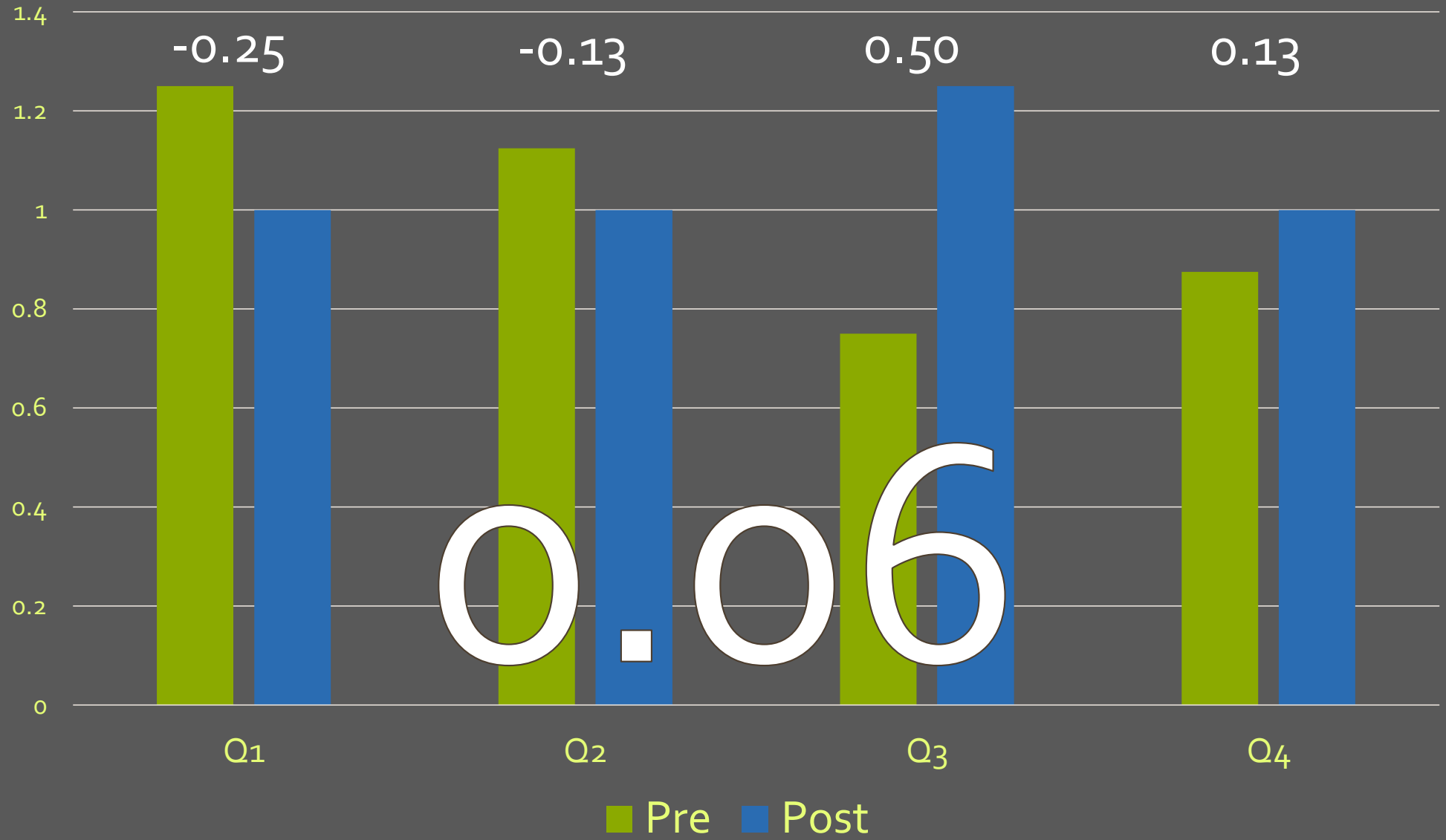


Respondents

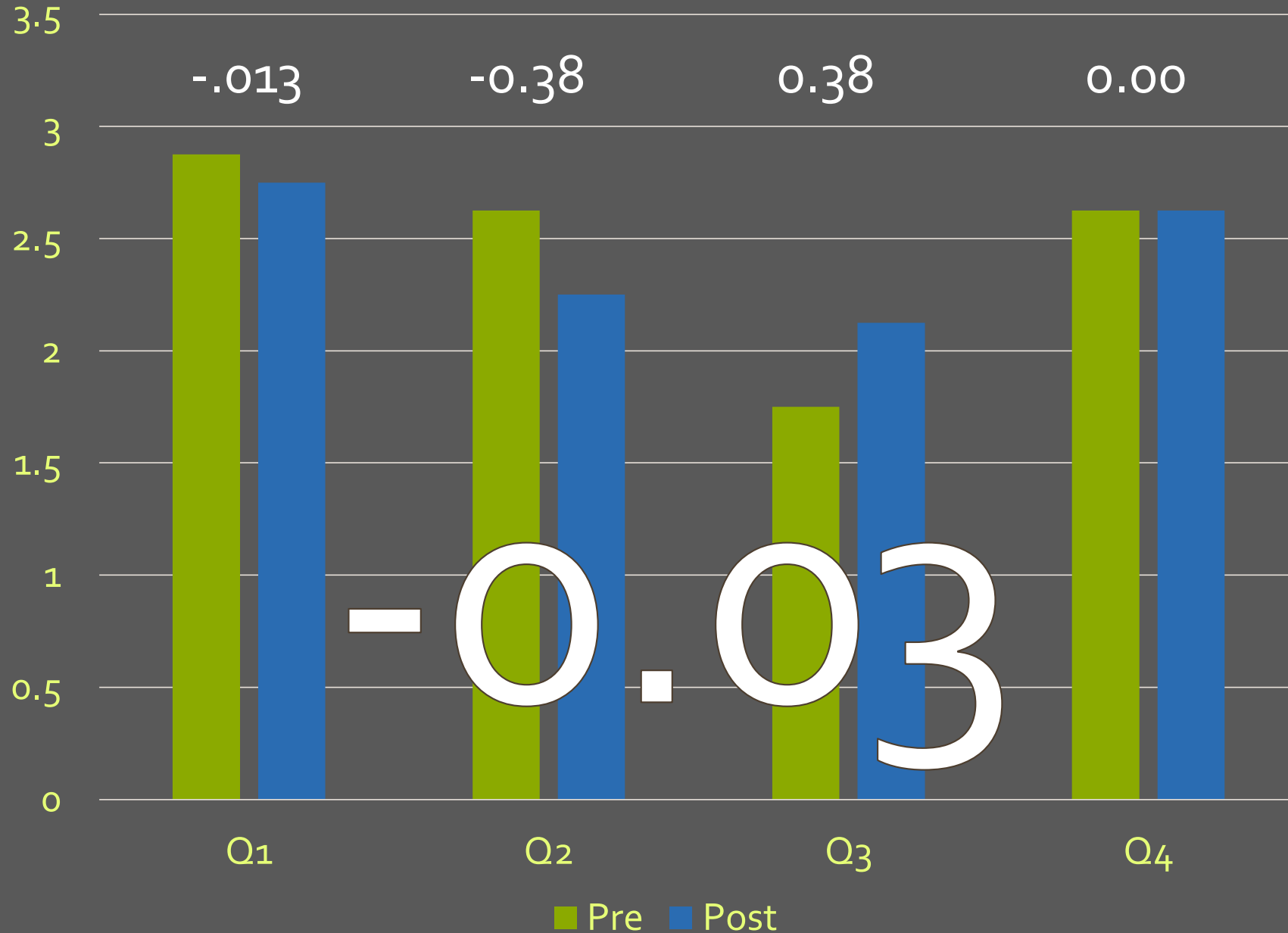
- $N = 9$
- 4 University of Arkansas (3 in class, 1 via distance)
- 5 University of Kentucky
- +2 University of South Dakota



Change in Number of Arguments per Scenario from Pretest to Posttest



Change in Argument Quality from Pretest to Posttest



Focus Group Themes

- **Beneficial course**

- Alternative solutions
- Increase marketability out of state

- **Technology led to opportunities and difficulties, but overall worth it**

- Course wasn't possible on one campus, but more students allowed course to be offered
- Two sites enables authentic discussion; more than two leads to stilted dialogue

- **Impacted solutions for IPM "tool box", but not how students thought of IPM**

- Scenario responses: no discussion of economics in pretest, but all responses included consideration of the business' economic limitations and/or goals



Conclusions & Discussion

- Course didn't alter number or quality of arguments, but did alter focus of arguments
 - Students moved to more economically-driven arguments from environmentally-driven arguments
 - Industry-based guest speakers enable students to view pest management problems from a business perspective
 - Industry-based guest speakers should be utilized in IPM courses to enhance students' ability to consider economic goals and limitations when constructing IPM solutions.
- Students valued the course
 - Course increased the number of IPM strategies about which they knew and their abilities to gain employment across the country
 - Recognized the potential for not having the course offered
 - Instructors should investigate ways to overcome challenges to offering low-enrollment courses if there is a small student body with great interest
- Students valued the multi-institution component of the course more so than they disliked the technological challenges, provided only two institutions were involved
 - Distance-based courses should include two sites; more is not better





Thank You!

Questions?

