Active Learning Strategies Impact Curiosity in an Introductory Animal Sciences Course

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Introduction

• **Traditional Learning:** student passively receives knowledge (e.g. lecture)

• **Active Learning:** anything that involves students in doing things and thinking about the things they are doing (e.g. case studies, peer teaching, group projects)

• Increasingly used in higher ed

Bonwell & Eison, 1991
Introduction

• Active learning requires **curiosity**

• Curiosity: a form of intrinsic motivation that is key in fostering active learning and spontaneous exploration

Learning progress hypothesis: positive feedback loop between curiosity and durable learning

Intrinsic motivation to search for learning progress

State curiosity: experience of learning progress

Learning, memory retention

Kaplan & Oudeyer, 2007
Factors affecting curiosity

• INTRINSIC to student
  • Personality, disposition
  • Prior knowledge and experience

• EXTRINSIC to student
  • Classroom
  • Activities
  • Instructor
  • Students

LEARNING ENVIRONMENT: Modifiable

Intrinsic motivation to search for *learning progress*

State curiosity: experience of *learning progress*

Learning, memory retention

Kaplan & Oudeyer, 2007
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ACADEMIC PERFORMANCE, WELL-BEING

Kaplan & Oudeyer, 2007
Interest in Animal Sciences

• Fewer students with farm background
• Reduced interest in food animal production
• Deficit in candidates to fill careers

• Cultivating early interest can influence college and career trajectory

Peffer, 2011
Objectives/Questions

• How do active learning strategies in an Intro to Animal Sciences Course impact student interest in studying animal sciences? Which strategies are most effective?

• How curious are students in studying animal sciences? Do levels change over the semester?

• Is curiosity level related to the perceived impact of active learning strategies?
Hypotheses

• Active learning strategies will increase student curiosity in animal sciences

• Active learning strategies will differ in their effects on student interest in animal sciences
Materials and Methods
Introduction to Animal Agriculture

• Introductory, required class

Fall 2017
• 238 students
• 79.3% females (n = 176)
• 75.7% freshmen (n = 168)
• 86.9% College of Agriculture (n = 193)
  Non-ANSC majors take to serve as STS university requirement

• **Lecture** - twice weekly 50-minute lectures
• **Lab** - weekly 110-minute laboratory sessions, ~50 students
Introduction to Animal Agriculture

- Shapes college career
- Opportunity to engage students early on
- Traditionally lecture-based, didactic
- Fall 2017 – Active learning elements added
Active Learning Additions

- Case studies
- Think-pair-share
- Exam review sessions
- iClicker Questions
- Laboratory stations
- Laboratory handouts
- Laboratory critical reflections
Methods

• Single group post-survey
• Administered via Qualtrics
• Response rate: \( n = 222, 93.2\% \)

• Instrumentation
  • Self-assessment questionnaire
  • Likert scales

• All procedures were approved by Purdue’s Institutional Review Board
Questionnaire

• Current (end of semester) and beginning of semester curiosity in ANSC
  • Likert scale 1-5, “Not at All” to “Extreme”

• Impact of each of the active learning elements on interest in studying Animal Sciences
  • Likert scale 1-5, “Strong Negative Impact” to “Strong Positive Impact”
Statistical Analysis

- Paired t-test
  - Pre- vs post-course levels of curiosity

- Pearson correlation coefficients
  - Pre-course curiosity level
  - Post-course curiosity level
  - Impact of learning activities on interest

- P-value <0.05 considered significant
Results
Species of Interest (multiple selections possible)

- Companion
- Beef
- Horse
- Swine
- Dairy
- Other (please specify)
- Sheep
- Poultry
- Fur (mink, fox, etc.)

# Students
Background

- 35.6% farm
- 64.4% non-farm
SELF-RATED LEVEL OF CURIOSITY IN ANIMAL SCIENCES

Pre-course
- Not At All
- Slight
- Moderate
- Very Much
- Extreme

67.1% Very Much/Extreme

Post-course
- Not At All
- Slight
- Moderate
- Very Much
- Extreme

65.3% Very Much/Extreme

Paired t-test  P = 0.1610
Level of curiosity in animal sciences

Learning Environment: Modifiable

Intrinsic motivation to search for learning progress

State curiosity: experience of learning progress

Learning, memory retention

Academic performance, well-being

Kaplan & Oudeyer, 2007
IMPACT OF LEARNING ACTIVITIES ON INTEREST

- Critical Reflection
- iClickers
- Lab Handouts
- Lab Stations
- Exam Review Sessions
- Think-Pair-Share
- Case Studies

- Strong Negative
- Negative
- Neutral
- Positive
- Strong Positive
IMPACT OF LEARNING ACTIVITIES ON INTEREST

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- Exam Review Sessions
- Think-Pair-Share
- Case Studies

- Lab Stations

- Strong Negative
- Negative
- Neutral
- Positive
- Strong Positive
Relationship between curiosity level and impact of learning activities on interest

<table>
<thead>
<tr>
<th>Activity</th>
<th>Post-Course Curiosity</th>
<th>Significance</th>
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<tbody>
<tr>
<td>Case Studies</td>
<td>0.37265</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Think Pair Share</td>
<td>0.32889</td>
<td>&lt;0.0001</td>
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<tr>
<td>Exam Review Sessions</td>
<td>0.16205</td>
<td>0.0157</td>
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<tr>
<td>Lab Stations</td>
<td>0.37725</td>
<td>&lt;0.0001</td>
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<tr>
<td>Lab Handouts</td>
<td>0.25573</td>
<td>0.0001</td>
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<tr>
<td>iClickers</td>
<td>0.19295</td>
<td>0.0039</td>
</tr>
<tr>
<td>Critical Reflections</td>
<td>0.19236</td>
<td>0.0040</td>
</tr>
</tbody>
</table>

- All activities correlated with post-course curiosity level
- Most strongly correlated:
  - Case Studies
  - Think-Pair-Share
  - Lab Stations
Correlation between post-course curiosity level and impact of learning activities on interest

Kaplan & Oudeyer, 2007
Discussion

• Case studies, lab stations more active:
  • Realistic
  • Inquiry-based
  • Group work

• Perfetto et al 1983 – creates more transferable knowledge
Improvements to Animal Sciences Courses

“The teaching and training of undergraduate students is still and will continue to be the most important function of animal husbandry departments."

Brown, 1940

• More informed instructional strategies to support curiosity, especially in introductory courses
  • More time investment in activities shown to be effective
  • Development of additional activities with similar features
Conclusions

Active learning strategies stimulated more interest in students with higher levels of curiosity in ANSC.

For students with higher levels of curiosity, more active, group-based learning strategies were the most effective of the learning strategies assessed.
Implications and Future Research

- Qualitative feedback – specific attributes of learning activities students found beneficial
- Effects on performance, health/career outcomes: longitudinal study
Thank You

Questions?