Evaluation of Student Engagement Across Differing Introductory-Course Activities

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Engagement

(Fredrick, Phyllis, & Paris, 2004; Blumenfeld & Meece 1988)
What is Engagement?

- **Engagement**: How students interact and connect to environment
- **Disengagement**: Lack of student interaction or connection

(Lanes & Harris, 2015)
Types of Engagement

Behavioral
- Discussion
- Taking notes
- Participation in activity

Cognitive
- Thinking about / focusing on topic
- Connecting to past knowledge
- Creating questions

Emotional
- See purpose / usefulness
- Fun / interesting

(Fredrick, Phyllis, & Paris, 2004)
Engagement Importance in Education

Increase Engagement

Increase Motivation / Effort

Increase Interest

Increase Achievement

(Connell et al., 1994; Rotgans, 2017; Marks, 2000)
Increasing Engagement

Task

Active Learning Problem Based Learning (PBL)

Engagement

(Blumenfeld & Meece 1988)
Active Learning

• Requires inputs from students; higher-order thinking

Problem Based Learning

• Learner-centered; information inquired; apply knowledge to solve problem

(Meyers & Jones, 1993; John R. Savery 2006)
Needed Research

- Effectiveness of implementation within classroom
- Factors of specific tasks in specific setting
- Combination of engagement assessments
  - behavioral, cognitive, emotional

Goal

- Improve student learning experience
- Evidence based improvements
- Resources
  - “more tools in tool box”

(Connell et al., 1994; Rotgans, 2017; Marks, 2000)
Context

Intro Animal Science Historically

• First ANSC Experience
• 100 – 200 students
• Lecture & Field Trips
• Sets the tone
• “not inspiring”

Intro Animal Science Currently

• Active Learning
• Problem-Based
• Group Work
• Field Trips

(Rogans & Schmidt, 2011)
Purpose

To compare students’ engagement level between three activities typically used in college courses (Lectures, Laboratory Stations, and Case Studies)

- Compare engagement levels
- Explore activity factors
- Collect feedback to improve
Research Questions

- Do students' engagement levels differ between the activities?
- Determine and compare to what extent the different activities influence engagement.
- What factors in learning environment and activity design influenced engagement?
Methods

- 16 Week Course Fall 2018
- Two 50 Minute Lectures /wk
- One 110 Minute Lab /wk
- 178 Students
- IRB Approved
- Mixed Methods
110 Minute Lab

5 Lab Sections

6 Groups per Lab Section

7:30am 1:30pm 9:30am 3:30pm 11:30am

5 – 7 Students per Group
**Methods - Treatments**

- Randomly Assigned Latin Square Design

<table>
<thead>
<tr>
<th>Group #</th>
<th>Period 1 (Week 5)</th>
<th>Period 2 (Week 7)</th>
<th>Period 3 (Week 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>Case Study</td>
<td>Lab Station</td>
</tr>
<tr>
<td>2</td>
<td>Lab Station</td>
<td>Lecture</td>
<td>Case Study</td>
</tr>
<tr>
<td>3</td>
<td>Case Study</td>
<td>Lab Station</td>
<td>Lecture</td>
</tr>
<tr>
<td>4</td>
<td>Lecture</td>
<td>Case Study</td>
<td>Lab Station</td>
</tr>
<tr>
<td>5</td>
<td>Lab Station</td>
<td>Lecture</td>
<td>Case Study</td>
</tr>
<tr>
<td>6</td>
<td>Case Study</td>
<td>Lab Station</td>
<td>Lecture</td>
</tr>
</tbody>
</table>
## Methods – Activities

- 5 Minute Instruction, 10 Minute Activity, 10 Minutes Survey

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Lab Station</th>
<th>Case Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Watched and listened to recorded lecture slides</td>
<td>- Group work</td>
<td>- Group work</td>
</tr>
<tr>
<td>- Individual notes optional</td>
<td>- Physically manipulated materials to answer questions</td>
<td>- Read and discussed real life scenarios</td>
</tr>
<tr>
<td></td>
<td>- Individual worksheet required</td>
<td>- Group worksheet required</td>
</tr>
</tbody>
</table>
Methods - Assessment

Assessing Student Perspective of Engagement in Class Tool (ASPECT)

- Validated & Reliable
- Survey Administered via Qualtrics
- 16 Items
- 6-point Likert Scale
  - Strongly Disagree – Strongly Agree
- 3 Subscales

(Wiggins, 2017)
Methods - Assessment

Assessing Student Perspective of Engagement in Class Tool (ASPECT)

• 3 Subscales
  • Value (9 questions)
    • Activities’ influence / usefulness / “fun”
  • Personal effort (3 questions)
    • Student interaction / input
  • Instructor contribution (4 questions)
    • Instructor aid / attitude effect on students

(Wiggins, 2017)
Methods - Assessments

Behavioral Engagement Related to Instruction (BERI)

- Video taped student activities (10 minutes max)
- 3 research assistants evaluated videos
  - Rated students engaged or disengaged
  - Set time points
  - Never repeated treatment or group evaluation
- Cohen’s kappa > 0.70

(Lanes & Harris, 2015; Landis and Koch, 1977)
Statistical Analysis

- SAS software (SAS Institute Inc., Cary, N.C.)
- Significance $p < 0.05$

**ASPECT**
- Least squares means of treatment effect
- MIXED procedure
- Schwarz’s Bayesian Information Criteria (BIC) for best fit
- No data were excluded

**BERI**
- Average BERI scores for each experimental activity for each group
- MIXED procedure
- Schwarz’s Bayesian Information Criteria (BIC) for best fit
- No data were excluded
Results:
Behavioral Engagement Related to Instruction (BERI)

<table>
<thead>
<tr>
<th></th>
<th>% of Students Engaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURE</td>
<td>62.08</td>
</tr>
<tr>
<td>LAB STATION</td>
<td>86.03</td>
</tr>
<tr>
<td>CASE STUDY</td>
<td>77.75</td>
</tr>
</tbody>
</table>

\( p < 0.001 \)
Results:

Assessing Student Perspective of Engagement in Class Tool (ASPECT)

<table>
<thead>
<tr>
<th>ASPECT Cronbach’s Alpha (Raw)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>0.930</td>
</tr>
<tr>
<td>Personal Effort</td>
<td>0.921</td>
</tr>
<tr>
<td>Instructor Contribution</td>
<td>0.806</td>
</tr>
<tr>
<td>Total Engagement</td>
<td>0.952</td>
</tr>
</tbody>
</table>

\[ p < 0.05 \]
Results:

Assessing Student Perspective of Engagement in Class Tool (ASPECT)

- Individual ASPECT items with significant difference between all activities
  - \( p < 0.05 \)

- Engagement Ratings: Lab Station > Case Study > Lecture

- Emerging Themes
  - Psychological influence - cognition & emotional
  - Group Influence – cognition & behavior

(Creswell 2013; Creswell & Miller 2000)
Results:

Assessing Student Perspective of Engagement in Class Tool (ASPECT)

<table>
<thead>
<tr>
<th>Psychological Influence</th>
<th>Group Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>• I had fun during today’s ___ activity.</td>
<td>• I made a valuable contribution to my group today</td>
</tr>
<tr>
<td>• The ____ activity <strong>stimulated my interest</strong> in the course material</td>
<td>• <strong>Group discussion</strong> during the ____ activity contributed to my understanding of the course material</td>
</tr>
<tr>
<td>• I was focused during today’s ___ activity</td>
<td>• Overall, the other members of my group made valuable contributions during the ____ activity.</td>
</tr>
</tbody>
</table>
Discussion:

Assessments
- Aligns and supports literature
- Pair well together

Group Dynamics
- Very influential
  - Helpful or harmful
- Tool to increase enjoyment, achievement, & engagement
  - Role assignments and peer evaluations

Challenge Level
- Enjoyment & interest connected to challenge level
  - “Challenging but achievable”

(Strati, 2017; Fredricks, 2002; Meyers & Jones, 1993; John R. Savery 2006)
Conclusions:

- Improve / Refine
- Purposeful and evidence based
- Assessments able to capture multiple types & levels
- BERI & ASPECT work well together
- Lab Stations > Case Studies > Lecture
- Group dynamic
- Physical materials
- Make them think

Take-Aways
Limitations

- Students have high initial interest
  - Self selected into course

- One semester sample
  - Caution over generalizing

- Limited Time
  - Testing effect
Thank You

Questions?