Circulate and Facilitate: Teaching in the Active Learning Classroom

The Active Learning Classroom: Directions and Impacts
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Session Overview

- Preparing to teach in the space (e.g., course redesign, replacing lecture)
- Teaching in the space (e.g., approaches, activities, assessment)
- Managing teams and resistance (e.g., team formation, dynamics, performance)
- Integrating technology (e.g., tech training, BYOD)
- Question & Answer
Classrooms as “built” pedagogy

Planning to Teach in the Space

Where do I start?  What takes the place of lecture?  How do I manage class flow?  How much time will it take?

Planning Teach in the Space: Where do I start?

• What the goals of the course?
  – What should students be able to know, do, value after the course?

• How do I find out what students know?
  – What types of assessment allow me to know if students are learning?

• How do I engage students (individually/teams) to apply and integrate knowledge?
  – What activities allow students to interact with each other and the subject-matter?

Preparing to Teach in ALCs: Alignment

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<table>
<thead>
<tr>
<th>Learning Goal</th>
<th>Assessment</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course: Introductory Biology I</td>
<td>Pre-class assignment on Canvas. Designed to assess whether students grasp the essential concepts from the Mini-lecture. Clicker Technology. Employed to assess student understanding of the more challenging concepts.</td>
<td>Lecture Wrapper. Students are asked to identify three important concepts from the mini-lecture and review. Collaborative Groups. Pre-formed teams work collaboratively to answer more challenging ideas. Online Peer Evaluation. Teams are paired to evaluate and discuss each other’s responses to the above collaborative exercise.</td>
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</tbody>
</table>

Students will be able to explain how leaf anatomy, chloroplast structure, and photosystem components effectively harvest light energy to produce ATP and NADPH.

Predictions of Meselson and Stahl Experiment

<table>
<thead>
<tr>
<th>Description</th>
<th>Diagram</th>
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<tbody>
<tr>
<td>15N DNA</td>
<td>Conservative</td>
</tr>
<tr>
<td>14N DNA</td>
<td>Semiconservative</td>
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<tr>
<td>Dispersive</td>
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Activity: Clicker Question 1

You move E.coli that were grown in $^{15}N$ to $^{14}N$ media. If DNA replication is conservative, what would you predict to see after 20 minutes (1 generation time)?

A) One top band of DNA and one bottom band of DNA of equal sizes
B) One thin top band of DNA and one thick bottom band of DNA
C) One thick top band of DNA and one thin bottom band of DNA
D) One thick top band of DNA and one thin intermediate band of DNA
E) A single intermediate band of DNA

Example Courtesy of Marina Crowder, Department of Molecular & Cellular Biology UC Davis
Assessment: Collaborative Quiz Question

7) UC Davis researchers are studying a newly discovered species of bacteria called Aggiesel. Recent experimental evidence suggests that amazingly, Aggiesel may not undergo semi-conservative DNA replication. To determine the mode of DNA replication, Aggiesel are grown in media with $^{15}N$ then moved to media with $^{14}N$. After 30 minutes (one replication), the Aggiesel are lysed and the lysate is spun. Below are the results of this experiment. Based on these results, what is the mechanism of DNA replication in Aggiesel?

- A) Conservative Replication
- B) Semiconservative Replication
- C) Dispersive
- D) Can not be determined from the data

Example Courtesy of Marina Crowder, Department of Molecular & Cellular Biology UC Davis

Preparing to Teach in ALCs: Alignment
Planning Teach in the Space: What takes the place of lecture?

- Research suggests that lecturing in ALCs mitigates the affordances of the space (e.g., Lasry, Charles, & Whitaker, 2014).
- Active learning must be integrated with intention (e.g., Walker, Cotner, Baepler, & Decker, 2008).
- Vary active learning strategies (e.g., Baepler, Walker, Brooks, Saichaie, & Peterson, 2016).


Planning Teach in the Space: What takes the place of lecture?

High Ease of Integration
- Pause for Reflection
- Muddiest Point
- Think-Pair-Share
- Gallery Walk
- Minute Paper
- Whole Class Discussion
- Informal Groups
- Simulations
- Team-based Learning
- Interactive Lecture
- Jigsaw Discussions
- Service Learning
- Experiential Learning

Greater Complexity of Integration
- Role Play
- Case Studies
- Buzz Groups
- Team-based Learning
- Interactive Lecture
- Jigsaw Discussions
- Service Learning
- Experiential Learning

Adapted from: http://www.coff.umich.edu/sites/default/files/resource_files/Active%20Learning%20Continuum.pdf
Planning Teach in the Space:
What takes the place of lecture?

1. Informational Transmission Session
2. Student Readiness Assessment (e.g., individual readiness assessment test)
3. Group/Team working session
4. Whole Room Synthesis
5. Follow-Up Work (optional, often aimed at more complex problems)

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Planning Teach in the Space:
What takes the place of lecture?

Bookend Model Sample for ALC

- Admin + Organizing --- Pre-class Poling
- 5-7 minute framing /recap/ set-up
- 3-4 minute activity (e.g., think, pair, share/ polling)
- 5 minute room share ---- 12-15 minute lecture
- 7-10 minute activity (e.g., case study/ data analysis
- 5 minute room share ---- 3-4 minute recap/ set-up
- Post-class Q+A

Planning Teach in the Space: How much time will it take?

This is a great classroom, I just think instructors need to be trained properly to use a space like this. — An ALC student

I think the classroom is great, but preparation is key to successfully teaching in one. — An ALC instructor


Planning Teach in the Space: How do I manage class flow?

• Ceding control and transitioning to a facilitator of learning can take time, so do it with intention
  – Start with high-ease of integration activities
• If you’ve taught in ALC multiple times,
  – collect data on the process to further inform your practices
  – Invite colleagues into the class to observe
Team-Based Pedagogy

- Define Team-Based Learning
- Review example course structure
- How best to form teams?
- How effective is TBL?

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What is Team-Based Learning, or TBL?

A highly structured, collaborative teaching method that involves student preparation outside of class and team activities during class

**Traditional lecture course**

**TBL course**
Key Principles of Team-Based Learning

▪ Accountability
  Students are accountable for their pre-learning and for working in teams.

▪ Assignments
  Team assignments must promote both learning and team development.

▪ Feedback
  Students must receive frequent and immediate feedback.

▪ Team Formation
  Teams should be properly formed and managed.

(e.g. Michaelsen & Richards, 2005)

Team Formation Strategies

• Random
• Let students form teams
• Instructor designs teams

How to make students into teams?
Teamwork

- Harmony vs. discord
- Collaboration vs. lone wolf
- Cooperation vs. “social loafing”
- Communication vs. blocking
- Homogeneity vs. cliques

How functional is a team?

Accepted Practice

Instructors should design teams for maximal diversity
- Skill set
- Background knowledge
- M/F
- Ethnicity
Research Questions

Do different team formation strategies affect:
- team diversity?
- course performance?
- student attitudes and preferences?

Course Description

- Course content is the human genome

- Flipped and team-based
  - Flipped: about half the content is provided via the web (minimal lecturing in class)
  - Team-based: students sit together in class, working on content, and work together outside of class on projects
The experiment

- Three separate sections
  - Instructor-designed teams aimed for high diversity*
  - Student-formed teams
  - Randomly formed teams
- Measurements
  - Average team diversity
  - Exam and quiz grades
  - Student attitudes

* Self-described skill set, year in school, M/F

Quantifying Diversity

How diverse is this team?
Quantifying Diversity

Did levels of team diversity differ?
Team diversity vs. team formation style

What do you predict? Which of the formation styles will have a more diverse set of students?

A. Instructor designed
B. Student self-formed
C. Random

Did levels of team diversity differ?
## Course performance outcome measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Components of the Measure</th>
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<tbody>
<tr>
<td>Individual performance</td>
<td>Exam and individual quiz averages</td>
</tr>
<tr>
<td>Team performance</td>
<td>Team quiz, team project and peer review averages</td>
</tr>
<tr>
<td>Effort</td>
<td>Online homework and bonus averages</td>
</tr>
</tbody>
</table>

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**Did course performance differ?**

![Performance Score Graph](image)
Team formation vs. performance

Now that we know that designed teams are more diverse, predict which of the team formation styles will lead to better student performance.

A. Instructor designed
B. Student self-formed
C. Random
D. There will be no difference between styles

Did course performance differ?
Student Attitudes and Preferences

- Most students were happy with how their teams were formed (85%)
- Students in self-formed teams were more likely to report that they worked outside of class with their team members
- Students in designed teams were more likely to report that they worked outside of class with other teams
- There were fewer team problems (loafers, missing class, tension) for the self-formed teams

The second experiment (different course)

- Two separate sections
  - TBL with student-formed teams
  - Lecture-format
- Identical content
  - Both employ active learning
  - Same instructor
  - Same homework, quizzes and exams
  - Same student cohort
TBL vs. “standard” pedagogy

What do you predict about student scores between a TBL section and a “standard” section?

A. The TBL section will have higher exam scores
B. The “standard” section will have higher exam scores
C. Neither section will outperform the other

Exam averages for TBL vs. non-TBL sections

![Chart showing exam averages for TBL vs. non-TBL sections]
Summary: Team-Based pedagogy and outcomes

- TBL produces similar outcomes to a “standard” active learning course
- Team formation styles can control team diversity
- Team formation styles have little effect on student outcomes
- Students learn collaboration skills in a team-based environment

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Integrating Technology: Basic Training

Integrating Technology: **Teaching Simulations**

1. You plan to open the class with a YouTube video of a movie trailer.
2. Then, you plan to play the first 10 minutes of the movie on the Blu-ray player.
3. Following the film clip, student groups will present the notes they took while watching the clip.
4. The groups need to display their notes on the monitors around the room.
5. Please conduct these tasks using the room’s technology and instructor console.
6. Hint: Be sure to attend to the audio, video, and lighting issues that may arise in this situation.

Integrating Technology: **Closing Points**

<table>
<thead>
<tr>
<th>Be Intentional</th>
<th>Reduce Distractions</th>
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<tbody>
<tr>
<td>Provide Multimodal</td>
<td>Organize!</td>
</tr>
<tr>
<td>Engagement Opportunities</td>
<td></td>
</tr>
</tbody>
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Integrating Technology: Closing Points

- Reduce Distractions
- Provide Multimodal Engagement Opportunities
- Organize!


Teaching in ALCs: Final Considerations (1/2)

- Preparation is key, consider the situational factors.
- Look for easy wins and high-ease of integration activities and assessments.
  - Consider existing resources: https://tinyurl.com/CEEJITT
- Circulate and Facilitate in the classroom
  - Guide learning through alignment between goals, assessments, and activities.
- Observe peers who teach in the space
Teaching in ALCs: Final Considerations (2/2)

• Consider different approaches to group formation, but disclose your approach.
• Show students the data about how active learning affects their cognitive development.
• Integrate technology when it benefits learning.
• Who can help you?
  – Seek help from CTL and/or Ed Tech teams
  – Consider team-teaching
  – Role of Graduate and Undergraduate Teaching Assistants
• Share your successes

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Tinyurl.com/ALCbook