



Team-Based Learning in Undergraduate Biology Education

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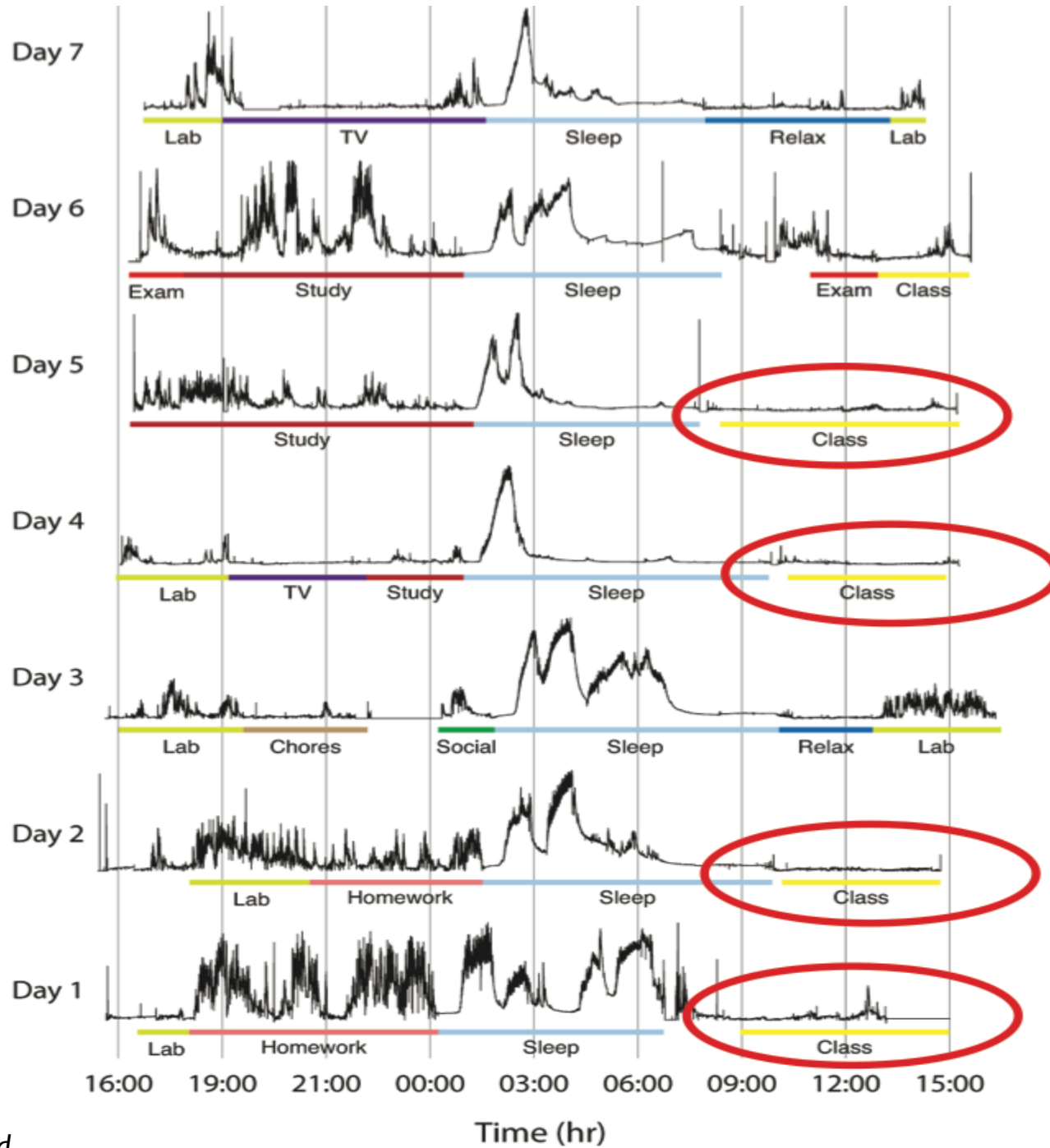
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Agenda

- Team-Based Learning (TBL) model
- Data supporting success in TBL implementation
- Experiencing TBL
 - Readiness Assurance Process
 - Team Application
- Sample Application Activities
- Challenges of TBL Implementation
- Questions?







Team-Based Learning as an Active Learning Approach

- Spend less in-class time delivering content
 - Places more autonomy on the student
- Transition from passive lecture to active learning activities
- Create opportunity to develop student skills that are unrelated to content but critical for the workplace

Components of TBL



- Permanent teams (5-7 ideal)
 - Evenly divide “assets” and “liabilities”
 - Questions or online tools (www.catme.org)
- Readiness assessed by individual and team quizzes (Readiness Assurance Process)
- Effective application activities:
 - Present a significant (interesting) problem, promoting higher-level learning
 - Require teams to work on the same problem
 - Engage teams by requiring a specific choice
 - Require simultaneous reporting of choices

TBL Classroom Flow



Structure of Team-Based Learning Module

Preparatory Materials
(Out of class)

Readings from text,
online
videos/animations,
online homework,
study guides

Readiness Assurance
Process
(In class, 1-1.25 hrs.)

Individual test → Same
test taken as a team →
Appeals →
Mini-lecture

Application activities
(In class, 2-5 hours)

All teams work on the same
significant problem that
requires them to make a
significant choice and report
simultaneously.



Freshmen (Majors) Biology, 2016-2017: TBL vs. Traditional Lecture Outcomes



- *Significantly higher final exam averages ($p = 2.24 \times 10^{-23}$)*
- *Significantly higher proportions in:*
 - *Pass rates ($p = 1.38 \times 10^{-4}$)*
 - *Success (ABC) rates ($p = 5.12 \times 10^{-8}$)*

Readiness Assurance Test



- Individual
 - pink
- Team

IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)
Name _____ Test # _____
Subject _____ Total _____
SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
7.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

The student receives the test.
All answers are covered.

IFAT forms: options of 10, 25, and 50 answer choices, A-D or A-E

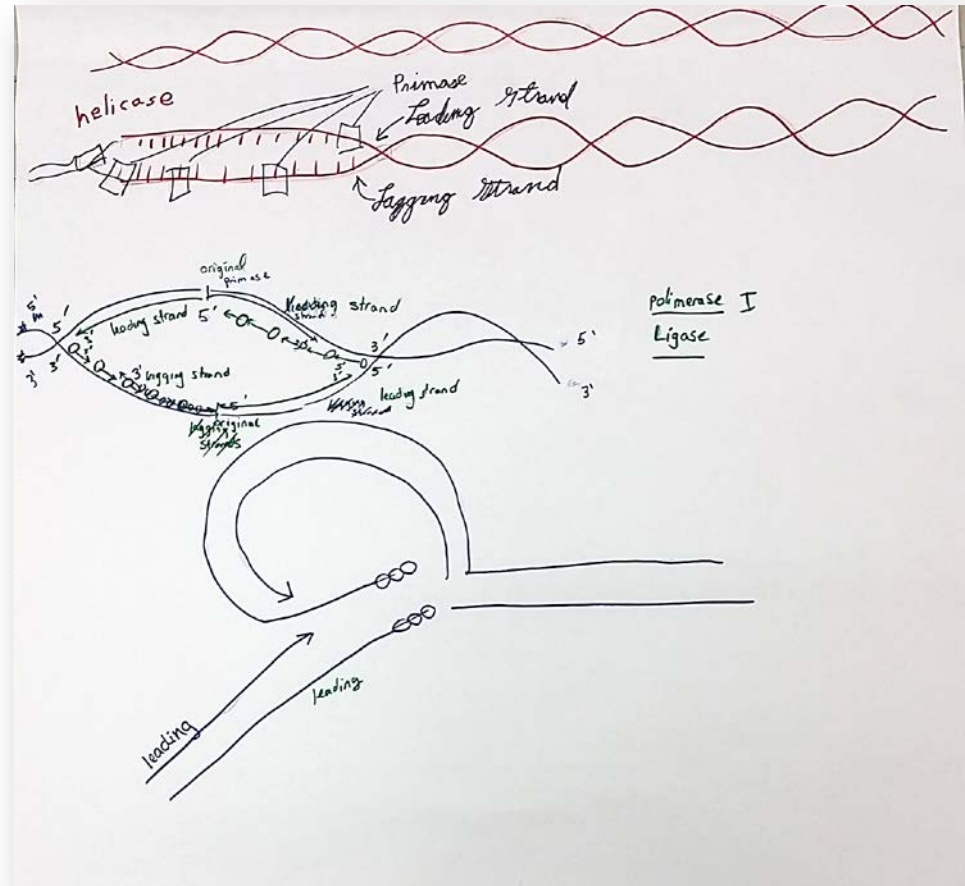
Sample Activities in Folder



Gallery Walk:
DNA Replication
purple

Modeling Activity:
Enzymes (Gleevik)
green

Restriction Challenge:
Miraculin Cloning
yellow



<https://www.youtube.com/watch?v=kxg5FTGZhZs>

Team Application Activity

(blue)

You are an instructor designing meaningful activities for your course. You have had your students prepare before class utilizing readings, video content, and/or other well-aligned activities. Having completed the readiness assurance process through taking a quiz individually and as a team, you want your students to apply, analyze, and evaluate the content by creating a classroom environment where there will be rich discussion that challenges their misconceptions.

Which of the following type of classroom activity would likely best achieve the objectives and why?

- A. Many Choice/Multiple Choice
- B. Gallery Walk
- C. Case Studies
- D. Modeling Activities
- E. Data Interpretation/Experimental Design





Challenges of TBL for Students

- Reliance on familiarity
 - Lecture is comfortable.
- Resistance to responsibility for their own learning:
 - Students are often uncomfortable learning material before it is taught in class.
 - Perception of having to teach themselves.
- Social anxiety/shyness/intellectual superiority = resistance to teamwork.
- Fear of freeloaders.



Challenges of TBL for Instructors

- Development of appropriate pre-lecture materials.
- Preparing students for new learning responsibilities.
- Gaining student buy-in so that students are committed to the process.
- Preparing students to work effectively in teams.
- Developing activities to promote learning beyond “remembering.”

Conclusions



- Team-based learning creates a classroom environment that increases student success through the implementation of active learning and peer-instruction.
- Team-based learning promotes development of higher-level thinking skills.
- Team-based learning helps students to develop skills required for employment and success in future endeavors.

Questions?

- Thank you for coming!
- If you would like electronic copies of any of the activities or of this presentation, please email us at ctwichell@Collin.edu or bkirkpatrick@collin.edu



Graded Components of TBL



- Individual (at home & in class)
 - Individual Score of Readiness Assurance Process (RAP)
 - Homework
 - Exams
- Team (in class)
 - Team Score of Readiness Assurance Process (RAP)
 - Team Activities
- Peer Evaluation used as stand-alone component OR used as multiplier for team scores (via www.catme.org)