

SET Final Presentation

BIOL 213: Anatomy & Physiology II

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Context & Purpose

- Observation: many students lacking basic study skills coming into my 200-level science class
- High-content, high-stakes STEM course
- Students often work hard but rely on inefficient study strategies
- Many underestimate the sustained effort required to do well in this course
- Goal: improve how students learn and perform without lowering rigor
- SET focus: learning supports embedded within an existing course




Design Principle: Using Exams as Learning Triggers

- Interventions placed immediately after Unit Exams 1–4
- Each exam used as a diagnostic checkpoint, not an endpoint
- Learning supports sequenced across the semester
- Progression: Awareness → Visualization → Measurement → Retrieval

Key Terms Used in This Project

- **Retrieval Practice:** Actively pulling information from memory rather than rereading (pull vs. push)
- **Spaced Repetition:** Intentionally revisiting unmastered material over time rather than cramming
- **Pomodoro Technique:** 25 minutes focused work, 5-minute break; no more than 2-hour blocks per session
- **Active vs. Passive Study:** Active (self-quizzing, taking notes, diagramming) vs. Passive (rereading, videos, podcasts)



Overview of the 4-Part L2L Strategy

- Part 1: Study Habits Reflection (Awareness) — after Unit 1
- Part 2: iPad Blood Flow Tracing (Visualization) — after Unit 2
- Part 3: Study Time Tracking (Measurement) — after Unit 3
- Part 4: Retrieval Practice & Spaced Repetition (Retrieval) — after Unit 4

L2L Part 1: Study Habits Reflection (Awareness)

- After Unit 1 Exam
- WHAT students did
 - Analyzed study strategies used for Unit 1
 - Reflected on obligations and created a time plan
 - Quantified daily activities using visual pie charts
- DESIGN
 - After Exam 1; focused on expectations and barriers to learning
 - Completion-based grading with anonymous peer review

L2L Part 2: iPad Blood Flow Tracing (Visualization)

- After Unit 2 Exam
- WHAT students did
 - Traced blood flow using guided worksheet
 - Used Visible Body app (3-D anatomy app) and diagrams to reconstruct from memory
- DESIGN
 - Aligned with cardiovascular content
 - Low-stakes, extra credit; focused on visualization and sequencing

L2L Part 3: Study Time Tracking (Measurement)

- After Unit 3 Exam
- WHAT students did
 - Used Pomodoro method; logged only active, tech-free study
 - Reflected on total effort vs. payoff
- DESIGN
 - Connected effort to performance; peer-reviewed for honesty

L2L Part 4: Retrieval Practice & Spaced Repetition

- After Unit 4 Exam
- WHAT students did
 - Created and peer-reviewed original Unit 5 quiz questions using a “2 truths and a lie” format
 - Corrected and reposted accurate versions to a discussion board
 - Answered classmates’ questions in two spaced review sessions several days apart
- DESIGN
 - Combined retrieval practice with peer verification and collaborative learning
 - Reinforced content through repeated exposure and self-testing across time



Evaluating Impact

- Same course content and assessments each semester
- Extra credit excluded from analysis
- Comparison: Fall 2023, Spring 2025, Fall 2025

Normalization & Grade Bands

- Normalized to 1000-point total
- Same grading scale used across semesters
- Grade bands: $A \geq 89.5\%$, $B \geq 79.5\%$, $C \geq 69.5\%$

Normalized Grade Outcomes (Core 1000 Points)

- Fall 2023: N=10, Mean=725.0, A=10%, B=20%, C=40%, Below B=70%
- Spring 2025: N=9, Mean=789.2, A=11.1%, B=33.3%, C=33.3%, Below B=55.6%
- Fall 2025 (L2L): N=23, Mean=780.2, A=8.7%, B=39.1%, C=26.1%, Below B=52.2%

Interpretation, Takeaway & Future Adjustments

- **Interpretation**

- Median increased while mean stayed stable → grades improved
- Gains were most pronounced among mid-range (B/C) students

- **Reflection**

- Some students may have focused more on earning extra credit than learning
- Deeper benefits may emerge in their future courses as strategies are internalized

- **Future Adjustments**

- De-emphasize extra credit framing
- Introduce study tools earlier in the semester



Student Perspectives

- Part 1: 'Mapping my time made me realize how passive I was.'
- Part 2: 'Drawing pathways helped me connect terms.'
- Part 3: 'Tracking study time explained my results.'
- Part 4: 'Writing questions revealed what I didn't know.'