



# Providing timely feedback and encouraging student reflection on weekly homework assignments in a large enrolment biology class.

a place of mind



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## Motivation and Background

An important goal of undergraduate physiology courses is to help students acquire knowledge that can be used to predict or explain responses in physiological system(s) in novel situations. Many physiology courses assess students through short- or long-answer exam questions asking student explain or predict a physiological response of one or more systems.

**Biol 260 (Fundamentals of Physiology)** is a large-enrolment (~500 students), lecture-based course that introduces concepts of cellular and organismal physiology in plants and animals. This course is a prerequisite for many upper level physiology courses.

### Weekly Course Structure

Before class	Targeted Pre-readings & Online assignments
During class (Tuesday)	Lecture slides with learning objectives Clicker questions Group discussion In-class worksheets Practice exam questions
After class	Homework assignment (practice exam question)
During class (Thursday)	Lecture slides with learning objectives Clicker questions Group discussion In-class worksheets Practice exam questions

### The focus: Homework assignment

- Exam-style, short answer question
- Delivered via course Connect site
- Required (almost) weekly assignment for marks

### The problem:

Students wanted feedback about:

- correctness
- sufficient level of detail in answer

*Insufficient staffing to mark all individual answers each week*

## The three-stage homework assignment

**Stage 1: Students answer a practice exam-style question**

**Stage 2: Students compare and contrast a range of student scripted answers for the same question in Stage 1 and select the best answer (or rank from best to worst)**

**Stage 3: Students are given an answer that received full marks and they use this answer to assess and reflect on their answer from Stage 1.**

This homework model was designed to incorporate various principles of learning by:

1. Allowing students an opportunity to practice exam-type questions in the first stage.
2. Providing students with an opportunity to compare and contrast among multiple, juxtaposed cases
  - A strategy that uses a critical thinking to organize complex ideas and has been shown to positively influence learning and transfer<sup>1</sup>.
3. Prompting students to assess their own performance and adapt their approaches within a cycle of self-directed learning<sup>2</sup>.

## Summary & Future plans

### Summary

- The current study was an important first step in providing evidence for the benefits of scaffolded processes in a homework assignment that allows students monitor and control and their learning
- Students perceived the value of contrasting multiple cases and reflecting on their own answer

### Acknowledgements

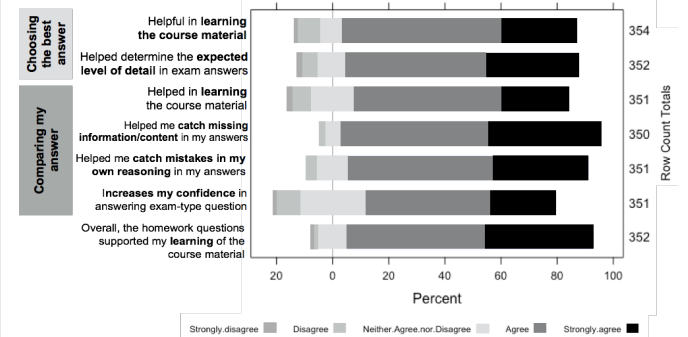
- Many thanks to the Biol 260 teaching team (instructors, TAs)
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### References

- <sup>1</sup>Schwartz, D.L., Chase, C.C., Oppizzo, M.A., & Chin, D.B. (2011). Practicing versus inventing with contrasting cases: The effects of telling first on learning and transfer. *J. Edu. Psych.* 103(4), 759-775.
- <sup>2</sup>Lew, M.D.N., and H.G. Schmidt. (2011). Self-reflection and academic performance: is there a relationship? *Adv Health Sci. Educ. Theory Pract.* 16(4):529-545

## Student feedback

### Midterm survey feedback



### Anonymous student feedback

- S1:** "I think it is better than just giving the correct answer. It allows me to figure out what parts of the answer I'm missing, and **reflect** on what I would need to put down as answer next time."
- S2:** "I think that having to get to see an exam answer that scored full marks gives me automatic feedback as to what I missed, but **choosing the best answer that is best is the most useful** part of the exercise. It makes me reason out why other answers are incorrect or didn't score full marks, and makes me better **reflect** on what I wrote."
- S3:** "The three stage homework assignment was one of the best things about this course, it is an excellent way not only to test what we learn in lecture but by not giving us the answer right away, it forces us to try it for ourselves first and then get instant feedback right away on what a perfect answer on an exam would be like. One of my favourite things about this course was the homework assignments"

### Further analyses:

- Grade quality of student answers to original homework question
- Assess quality on reflection portion of assignment
- Analyze how the self-reported behaviours compare with the quality of the reflection stage of the assignment
- Examine student performance on exam transfer question
- Examine additional correlates (exam grades, gender, etc)