

Utilizing ungrading approaches to encourage intrinsic motivation in a molecular biology laboratory course

Jenean O'Brien, PhD

The College of St. Scholastica

Duluth, Minnesota, USA

Objective

Ungrading is an educational approach focused on shifting student focus away from earning points and toward intrinsic motivation^{1,2}. By removing traditional grading systems and instead centering on **learning goals, feedback, and self-reflection**, students are encouraged to focus on the learning process and the joy of discovery. This sounds exactly like a mission statement for laboratory courses, **but how do we do it?**

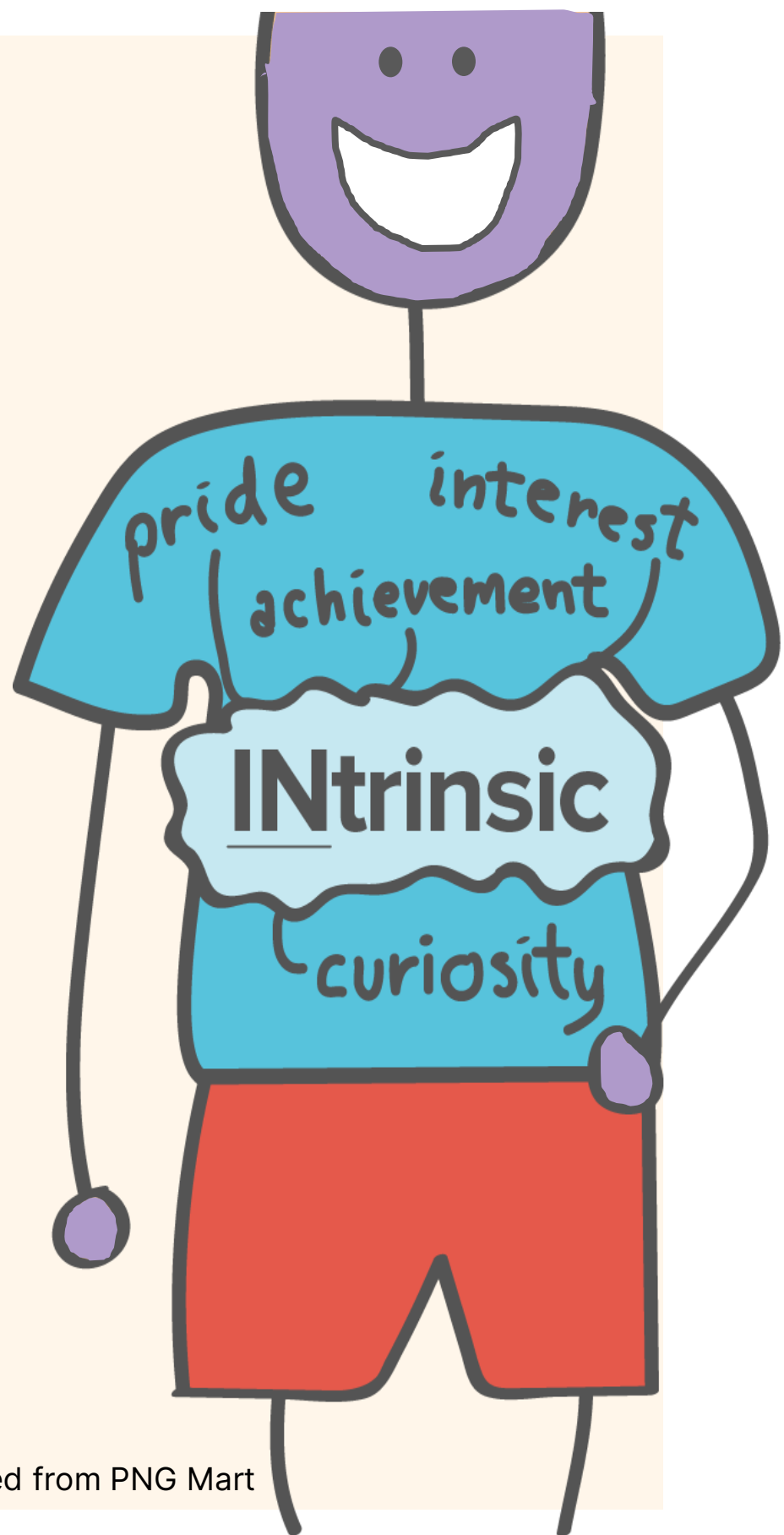


Image adapted from PNG Mart

Implementation

Our laboratory course is designed to mimic how professional researchers perform molecular biology, with novel research questions that could generate publishable results³. All course assignments are actual professional research activities, including maintaining laboratory notebooks, designing figures and presenting research posters. I wanted our learning assessments to also model how we evaluate performance in our field.

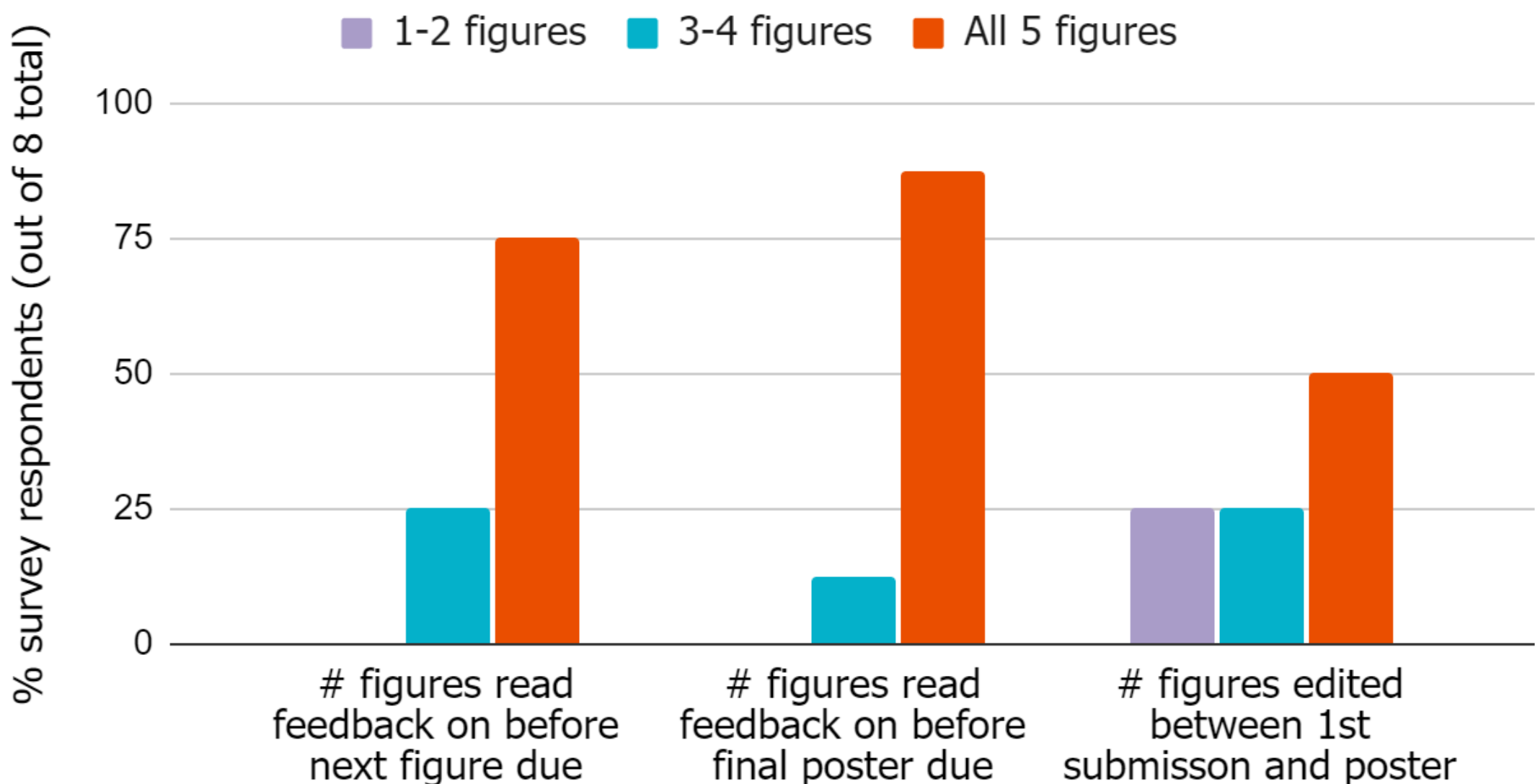
Therefore, I utilized two ungrading techniques:

- instructor **feedback without points**
- and **reflective essays** focused on **learning goals**.

Feedback/No Points

Previous research indicates that task-based instructor feedback only, not associated with points, can increase student interest and performance⁴. In our course, after each experiment, students created figures with captions to describe their design, technique and results - and received only comments from the instructor, no points. Students were encouraged to use this feedback as they incorporated their figures/captions into their final research poster.

Student Viewing of Instructor Feedback (data from Student Survey)



How did the experience of receiving only instructor feedback and no points affect your course experience?

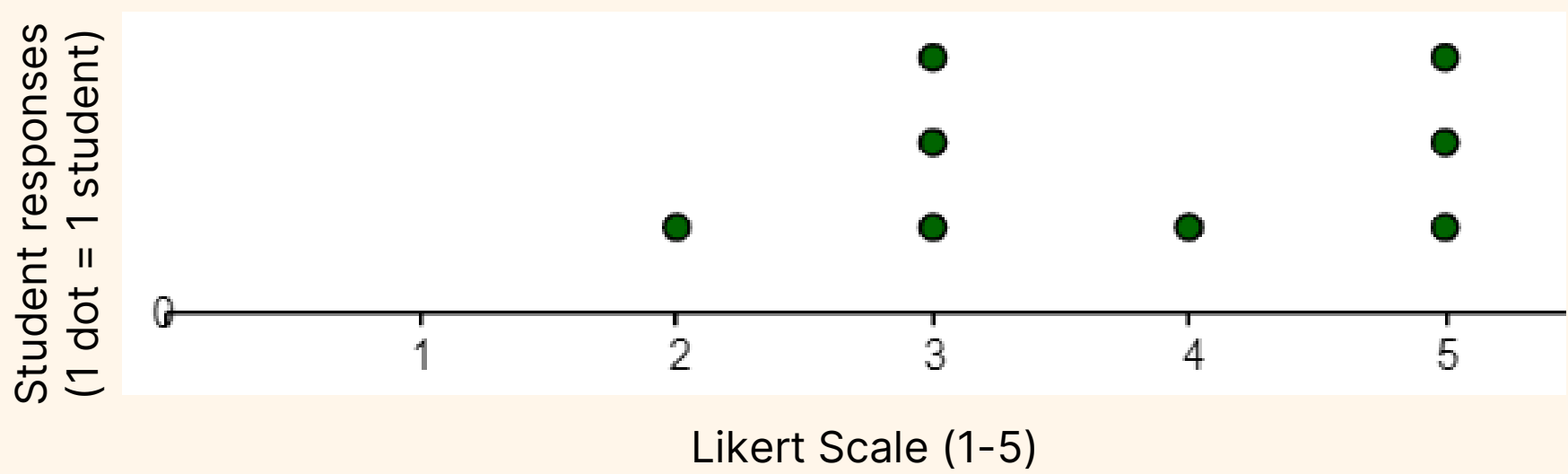
- It **reduced pressure** of doing assignments perfectly and **motivated me to change** things on the next assignment.
- It was great, it made everything **less stressful** so I could **focus my energy on technique** and getting it right instead of my grade.
- It helps me **focus more on actually learning** the materials on the assignment rather than just following rubrics and guidelines just to get the best grade.
- I have found that while working on the assignments, I was **more focused on understanding the content** so I could feel more comfortable in class rather than memorizing terms and patterns to transfer on to an assignment for points. It has **made my lab confidence higher** as hearing feedback instead of a point number allowed me to know what to change next time. I was also **less intimidated** of O'Brien as I saw her feedback as her trying to **really help me** rather than just a grading of what I did.
- I really enjoyed the course not having a grade for each assignment. It **relieved the pressure** of knowing that each thing will be awarded a specific grade. I liked to have **your cumulative effort and work reflect a grade**, not just a specific assignment or test.
- I felt **less stressed** while completing the assignments when I was not sure if my understanding was completely correct. I felt like I was **able to learn more from my mistakes**.
- It was great because it **relieved a big pressure** that college students have in their college courses.
- Not being pressured to complete work based on strict grading guidelines allowed me to **approach the coursework with an open mind**. I spent less time feeling stressed about grades and **more time focusing on what was expected of me**.

How did the experience of receiving only instructor feedback and no points influence your motivation to complete coursework?

Likert Scale:

- 1 = much less motivated than when you also receive a point score
- 2 = a bit less motivated than when you also receive a point score

- 3 = same amount motivated as when you also receive a point score
- 4 = a bit more motivated than when you also receive a point score
- 5 = much more motivated than when you also receive a point score



Reflective Essays

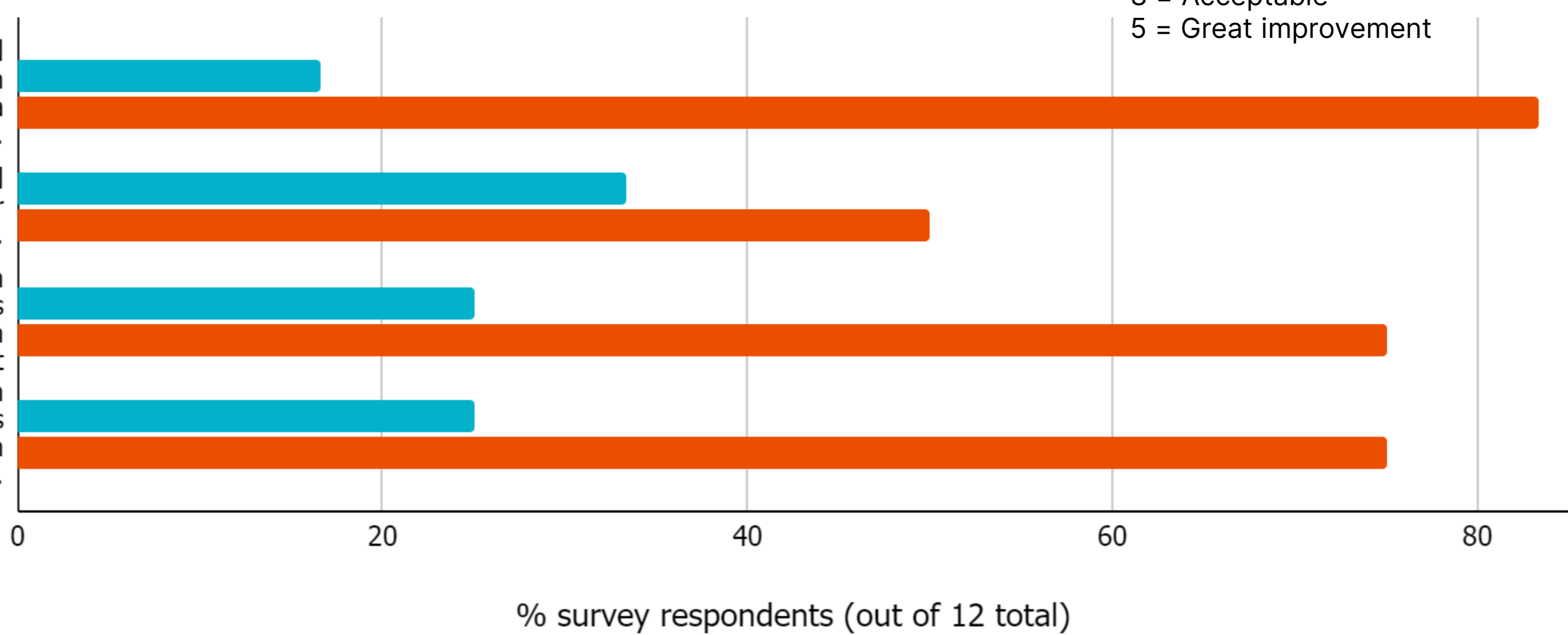
The reflective essays are structured similarly to the case statement many researchers write as part of their promotion/tenure process. Here, students practiced metacognition as a way to build intrinsic motivation. Students stated their case for their progress on course objectives by citing their own evidence and provided an explanation of the letter grade they thought they earned in the course.

To what extent did the course help you achieve the following Learning Goals:

- 1) Read, understand, develop, and practice research protocols in the process of answering a research question.
- 2) Discern the benefits and limitations of several molecular biology approaches.
- 3) Communicate your results in both written and oral form as would occur in a research laboratory environment.
- 4) Demonstrate proficiency in basic molecular biology skills including pipetting and bench organization.

Student Survey of Learning Goals

Likert Score of 4 Likert Score of 5



Likert Scale:

- 1 = Fell way too short
- 3 = Acceptable
- 5 = Great improvement

How did the experience of stating your case and/or explaining your grade affect your course experience?

- Stating my case **completed the full circle of course objectives** that were communicated on the first day of class. Those **objectives had a purpose throughout the whole semester** rather than just being stated and forgotten on the first day.
- It was helpful because in most courses we just have to rely on our grades regardless of circumstances that hindered or helped our time commitments in school. With our case statement **we were able to defend the progress we made as well as explain ourselves**, which was greatly appreciated.
- I **don't have to worry about not doing as good as my peers**, just doing better than I started with at the beginning of the semester.
- I think it **challenges me to not be hard on myself** and communicate where I think I am at in the learning process.
- **Advocating for myself** has always been something I have not been too good at. After writing about the visible progress I have made, it was easier for me to advocate for a higher letter grade for myself. I think it is important to complete assignments that can feel a bit uncomfortable because they **can only lead to growth**.

Resources

1) Blum SD, editor. 2020. UNgrading: Why Rating Students Undermines Learning (and What to Do Instead). 1st ed. Morgantown(VA): West Virginia University Press.
2) Strommel J. 2020. Ungrading: an FAQ [Internet]. Denver(CO): Jesse Strommel. [cited 2023 Jan 28]. Available from: jessestrommel.com.
3) O'Brien JH, Kruchten AE. 2023. Snowflake CURE: Isolating Microbial DNA from Snow for Metagenomic Analysis to Assist Undergraduate Students with Learning Molecular and Biostatistical Tools. Article 16 in: Boone E and Thuecks S, editors. Advances in Biology Laboratory Education. 43. Publication of the 43rd Conference of the Association for Biology Laboratory Education (ABLE).
4) Butler R. 1988. Enhancing and Undermining Intrinsic Motivation: The Effects of Task-Involving and Ego-Involving Evaluation on Interest and Performance. British Journal of Educational Psychology. 58(1):1-14.