

No Grades in College STEM Classes:

More Value, Less Pressure, , and More Learning

#2321167: Evaluating the Effect of Alternative Grading Strategies on Goal Orientation, Motivation, Self-Efficacy, and Content Learning.

When there are no grades, the value of the course increases and perceived cost decreases



Intrinsic value:

How interesting, enjoyable, or personally satisfying students find a class or subject.

"I enjoy learning this."



Utility value:

How useful students believe the course content will be for their careers, goals, or everyday life.

"This will help me in the future."



Attainment value:

How important success in the course feels to a student's identity, personal goals, or sense of accomplishment.

"Doing well in this matters to who I am."

Cost:

The emotional or practical burden students associate with a course, such as stress, anxiety, workload, or sacrificing other priorities.

"This takes too much stress, time, or effort."



Performance goal orientation is lower in ungraded classes

Perception of course structure

The course environment focuses on rankings, competition, or proving ability.

Performance approach

Students' focus on demonstrating ability, earning high grades, or outperforming peers.

Performance avoidance

Reflects concern about making mistakes, looking unintelligent, or performing poorly compared to others.

Perception of mastery goal orientation

Reflects students' perception that the course encourages understanding, growth, effort, and skill development rather than competition.

"This class emphasizes learning and improvement."

Mastery goal orientation

Reflects students' focus on developing knowledge, improving skills, and understanding material deeply.

"I want to learn and improve."



NO DIFFERENCE IN MASTERY GOAL ORIENTATION

- * Mastery goal orientation was high in both types of classes:
Perception: 4.36/5 for graded and 4.4/5 for ungraded
Students' goal orientation: 3.79/5 for graded and 4.0/5 for ungraded.
We are waiting for longitudinal data.



Students learned more in classes without grades. By the end of the course, ungraded classes showed higher scores.



CONTENT KNOWLEDGE GAINS WERE HIGHER IN CLASSES WITHOUT GRADES

The change was more pronounced when we looked at changes in scores within individuals. We found a 20% difference in average individual gains between students in graded vs ungraded classes.



METHODS

- 555 students in graded and ungraded General Biology 2 and Genetics courses at Florida International University (Fall 2024-Fall 2025)
- Expectancy Value and Goal orientation validated instruments^{1,2,3}
- Structural Equation Modeling

Content Knowledge

- Students in a Genetics course at FIU (Fall 2025-Spring 2025)
- Genetics Concept Inventory⁴
- 600 pre-course entries, 119 post-course entries in graded courses, 124 post-course entries in ungraded courses
- Wilcoxon test + Cohen's d
- Within-subject analysis for 80 students with pre-post course data

CHALLENGE OVERCOME

I learned to perform SEMs
I struggled with time management as a teaching faculty, but got course releases and a postdoc hire during the last year, which allowed me to complete the data analysis presented here.
I am slowly convincing faculty in my department to try "Ungrading" - data driven changes.



References

- 1 Battle, A. & Wigfield, A. 2003. Journal of Vocational Behavior 62(1)(2003): 56-75.
- 2 Midgley, C., et al. 2000. Manual for the patterns of adaptive learning scales. Ann Arbor: University of Michigan, pp734-763.
- 3 Pintrich, P.R., 1991. A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)
- 4 Smith, M. K., et al. 2008. The genetics concept assessment: a new concept inventory for gauging student understanding of genetics.