



Understanding the student perspective on mastery-grading

Dr. Tyler Pattenden (School of Mathematics, Economics and Management)
King's University College
May 4th, 2022



Standards-Based (Mastery) Grading

- Assessment strategy based around the idea of the mastery of “outcomes”
 - We call these outcomes “goals” in our classroom
- Students are formatively assessed many times throughout the term and are assigned a score on their work for each goal **individually**
- Students are able to re-assess previously unmastered goals outside of class time to demonstrate mastery of the goal
- Students must score a certain amount of “mastery” points to pass the course



“Scoring System” Used

4	Exceeds expectations!	Correct, complete, convincing, and clear with proper notation. Wonderful job!
3	Mastered	Demonstrates understanding of relevant goal. May include some errors, but no additional study or review is needed.
2	Progressing	Demonstrates partial understanding, but with a fundamental error, misunderstanding, or is incomplete. Needs review and revision.
1	Does not meet goal	Not enough work to determine mastery. Attempt is not clear or not complete, or large error has been made. Needs review and revision.
0	Not assessable	No work demonstrated.



A brief on the course - MATH1228A/B

- “Methods of Finite Mathematics”
 - Basic counting, probability and random variables
- Mandatory course for **psychology** majors at King’s (along with an introductory statistical methods course)
 - 201 students total over fall and winter term – 172 students identified as “psychology” majors (~85%)
- Taught at both main campus and King’s – *often using same lectures, text, and assessments*
- History of poor performance in course at King’s
 - 2019/20 and 2020/21 academic years – King’s average was just > 50%



Assessment Structure for 2021/22

- Attempted to stay away from using traditional assessment terminology
 - Quizzes → “Mastery Checks”
 - Midterms → “Uber Mastery Checks”
 - Final Exam → “Final Uber Mastery Check”
- Six MCs (5 goals per check)
- Two UMCs (~10 mandatory checks, and a large amount of “optional” checks)
- One FUMC (~12 mandatory checks, and all previously checked goals)
- **50 goals** total in Fall 2021 and **52 goals** total in Winter 2022



Examples of Goals

- PR12 Finish an incomplete probability tree by stating and using the properties of probability trees.
- PR13 Given a verbal description of a problem, construct a probability tree and use the tree to answer word problems.
- PR14 Use Bayes' Theorem to calculate probabilities.
- PR15 Calculate the probability of k successes given n Bernoulli trials.
- PR16 Calculate the probability of *at least* k successes or *at most* k successes given n Bernoulli trials using indirect counting methods.



Grading Structure

Grade	Learning Goals	MathMatize (percentage of quizzes with mark of 90% or greater)
A (85)	≥ 42 goals graded as 3 or 4 with at least twenty 4's	90% (approximately 15 activities)
B (75)	37 – 41 goals graded as 3 or 4 with at least fifteen 4's	80% (approximately 12 activities)
C (60)	31 – 36 goals graded as 3 or 4	70% (approximately 11 activities)
D (55)	26 – 30 goals graded as 3 or 4	60% (approximately 9 activities)
F (<50)	Have not fully completed any row.	



End of course findings (general)

- Course average in fall term 2021 – 85% across two sections of 126 students
- Course average in winter term 2022 - 77% from one section of 75 students
 - Two sections taught “traditionally” - 61% average from 103 students
- Attendance was higher than usual - enrollment was capped at 75 in each of my sections
- > 95% of students “re-assessed” at least one goal throughout the term – much higher than expected
 - Constant stream of students (in both terms) during student hours
- **Downfall** – no check of retention of material; “one and done”



Student Perspectives Survey

- Interested in the student perspective on this assessment model (*data-driven pedagogy*)
 - Stress and anxiety?
 - Confidence?
 - Learning?
- Received ethics approval from King's to run a survey to collect student feedback after the course was completed
 - Wished to collect during the term ("check-ins") but process took longer than expected
- Data is still being collected – results and findings are thus preliminary



Some interesting findings

- 85% of responders had never had a course that implemented mastery grading
- 70% of responders stated that their initial anxiety and stress in relation to this course was “somewhat high” or “high”
 - “I am bad at math”
 - “...heard this was a hard course...”
- Majority reported being fearful of “mastery grading” upon initially learning about
 - “Confusing structure”
 - “Never encountered before”



Some interesting findings

- All respondents agreed with the following:
 - Mastery grading was fair
 - Mastery grading allowed me to feel like I could succeed and do well
 - Mastery grading kept me engaged with the course content throughout the whole term
 - I would be excited to take another course that utilizes a mastery grading assessment structure
- Some additional comments:
 - “Mastery grading allowed me to actually learn and retain the content of the course. It alleviated stress resulting in higher performance.”
 - “I very much enjoyed the master grading style, I could definitely notice a difference in my learning as I was less stressed going into tests/quizzes and it was reassuring to know I had the opportunity to improve on different course content anytime throughout the term which was way less discouraging then what I experience in other courses”
 - “... I really enjoyed the grading system and I think it is a more accurate way of determining a students understanding of the course by giving them the opportunities to succeed.”

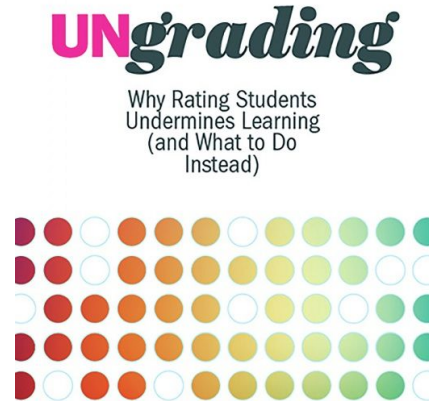
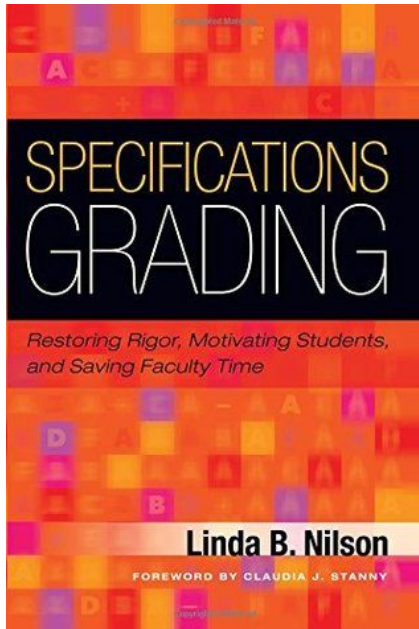


Where do we go from here?

- The assessment structure needs some adjustments on the instructor end
 - Workload ugh
- Students *seem* to enjoy this style of assessment – especially in a mathematics course (task based)
 - Less stress on tests and quizzes
 - More opportunities to do well – which apparently students like! Who knew?
- Provide student feedback to other instructors to demonstrate the need for a shift in assessment methods



Questions?



EDITED BY
Susan D. Blum
With a foreword by Alfie Kohn



<https://college-bridge.org/our-services/conferences/the-grading-conferences/>

