

## Formative Assessment Grading Methods.

For the quizzes, which are usually only two questions, I grade each question Mastery (M), Near Mastery (NM), Tentative (T), or Unsure (U). For any problem on which a student does not receive a Mastery, he can redo the problem and resubmit it (once). I will re-grade it and give the student a higher grade without penalty. In my grade book, a M equals 3 points, a NM is 2 points, T is 1 point and U is zero, but I do not stress this aspect to the students.

Rationale for this grading scheme.

This approach is based upon the research [Black and Wiliam, 1999; Black et al, 2003] that shows students learn more when they are made aware of what they do not understand and then take steps to correct this lack of understanding. The M/NM/T/U gives the student feedback about their level of understanding. They then have the opportunity to do further work on items they have not yet mastered. They are motivated to do this work by being given the chance to improve their grade.

In explaining this approach to students, I stress that I am interested in them learning the material and that learning does not happen at the same time for everyone and it does not happen immediately. The key thing is that they keep working at it.

The idea of not giving a traditional grade for the quiz (either numerical or A/B/C) but instead focusing on proficiency related to the task, was motivated by the research that shows that feedback involving grades does not lead to improved student learning [Black et al, 2003]. The most impactful feedback is comments without grades. The M/NM/T/U is a type of comment to the student on their understanding without a grade attached.

For the mid-terms, at least for the first one, I again grade each questions M/NM/T/U for the students to see. In my grade book, I translate these assessments into numerical grades. When they get the test back, students have one week to re-do any questions on which they got less than M. I re-grade their work on the M/NM/T/U scale and give them partial credit for any improvement they show. For example, if a students goes from a T to a M on a question, I will give them 1/3 of the additional points they have earned.

When I hand back the re-graded exam, in addition to their new assessment on the M/NM/T/U scale, I also now show the students the numeric grades I have assigned them.

Ideally I would like to develop a set of competencies goals for the course and evaluate whether a student has demonstrated Mastery of these competencies by the end of the course. Then the fraction of competencies mastered out of the total number of competencies would be translated into a final grade. My present assessment system is a middle ground towards this ideal.