

Exam Wrapper: Explaining Why

Educator: Doug Faust, Physics, Astronomy, Computer Science, and Engineering

Context: Out of class; Engineering Physics I

Keywords: exam wrapper, physics

Student Activity Time: 1-2 hours

After a difficult exam, students earned partial credit for reworking problems and explaining why they missed it on the exam.

Introducing the Reflection Activity

The engineering physics series is one of the more challenging course sequences that students take before transferring to a 4-year institution. After taking a difficult exam, students earned partial credit by reworking missed problems, and including a brief explanation of why they missed the question. The purpose of the activity was to assist students in reviewing misconceptions, difficult concepts, and rebuilding confidence.

The educator set the stage for a very challenging exam, and after grades were returned, many students were disappointed with their score. In this particular case, students received their exams with a red mark drawn through each question; this small step helped students to see that there were no perfect scores in the class. Students were allowed three to four days, to correct missed questions and present a perfect solution in exchange for partial credit. Students were allowed to use any resource available to them—human, web, textbook, and even the instructor, to develop the correct answer and on their own, respond to the prompt “explain why you missed this problem?” for partial credit. In explaining why, students highlighted misconceptions, incorrect use of mathematics, and preparation for the exam through a learning lens.

In terms of outcomes, this activity enabled students to identify strategies to prevent errors in test taking, and fill gaps in their knowledge of the content. The meaning derived by students varied, but aimed to support confidence in being a problem solver, and assisted students in identifying ways to improve their preparation methods for subsequent exams.

Recreating the Reflection Activity

	Description
1	Set the stage for and administer a difficult exam in the class preparation leading up to the exam date.
2	Administer, grade, and return the exam in a relatively short time period.
3	Provide students with the exam retake assignment including the “explain why” prompt.
4	Allow students 3 to 4 days to complete the assignment.
5	Grade exam retake and give credit/no credit for responses to the “explain why” prompt.

In the Words of the Educator: Tips and Inspiration

Creating the narrative. You have to make sure that they understand the narrative; “you were given a hard exam, you need to do corrections, you can talk to each other and come to me and complain” stuff like that. It’s important to make sure that they understand what’s going on, because if you don’t and just give them a bad grade all they will see is a C- in red ink. It can turn the focus away from their perceptions about their own ability in a positive way. If they understand that you wrote a hard exam and they have to correct it to get points back, it’s about you being a difficult professor.

Timing the assignment. The important part is to offer the chance to earn points right after the exam, because they are still stinging. When they are still reeling from a difficult exam, it can provide an opportunity to talk about study habits. They also know that the final exam is comprehensive. By giving them three to four days to re-do the problems and allowing them to use any resource, the students who are truly interested in learning the material get a lot out of it.

What was the inspiration for the reflection activity? It’s pretty traditional to do test corrections in physics, but I did not offer it to students the first time willingly, I just happened to write a really hard exam. I misjudged their preparation for the class and the low exam average was unacceptable for this context. Curving the exam is basically giving points away for free, and I didn’t want to do that. I offered them the chance to write corrections – each problem had to be perfect to earn some points back. For every problem they lost points on, they had to submit a perfect version that could be used as a rubric, and for icing on top, why did you get the problem wrong—just one sentence. I set the bar high for getting partial credit, because everything had to be perfect and well explained.

You really have to let them know that you are the villain, it’s not them being stupid - you wrote a hard exam. That way you don’t have to crush egos.