Post-exam Reviews: Turning Wrong Answers Into Learning Moments

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Author Biography

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Test-review strategies can help students learn material before an exam, but do students learn from their errors after the tests are returned to them? Grounded in metacognitive principles of reflective practice, a post-exam review enables students to analyze the reasons why they performed as they did on an exam as part of an effort to regular their own path of self-directed learning for future improvement (Owens, 2019). This article, building on prior research about improving test review and recall, shares information from two courses on using a test autopsy as a self-regulated learning approach to prepare students better for tests and direct them toward their own learning.

Introduction

With text anxiety rising among college students, preparing for course examinations can be intimidating, even after a study guide highlighting the main concepts was given. Test reviews are effective for both students and instructors. Interactive test-review approaches help students know the information better. Connecting to course material using social media or digital platforms and using flashcards the right way, among other approaches, can help fill in the gaps with information that students might not have grasped from project-based experiences (Shemberger, 2017).

However, what happens after the test, especially after grades are released? For a few minutes at the start of class, an instructor might revisit answers to questions asked on the test, but does that help learners? This article focuses on a self-directed learning practice known as a test autopsy in which the student seeks to understand why he or she did not answer the question correctly. With the test-autopsy approach, college and university faculty might consider a post-exam review as a new way to use scholarship of teaching and learning (SoTL) to improve their teaching and student learning.

Literature Review

Learning is a dynamic process that consists of making sense and meaning out of new information and connecting it to what is already known. To learn well and deeply, students need to be active participants in that process. This involves doing something

(Barkley, 2010, p. 94). The ability to store, retain, and later retrieve information is fundamental to learning. Test reviews are a form of active learning because they help the learner to store, retain, and later retrieve information--the fundamental blocks to learning. Active learning means that the mind is actively engaged (Barkley, 2010). Students are more likely to remember material in which they have made an emotional investment or connection (Barkley, p. 35). Furthermore, if a student can remember the information after 24 hours, likelihood is greater that it is in long-term storage (Barkley, p. 101).

Three domains of learning are central to this discussion. Learning activities will be most successful if students are engaged on a *cognitive* level (students are thinking about what they are doing), an *affective* level (students enjoy what they are doing and give it their full attention) and, when possible and appropriate, on a *psychomotor* level (students apply the theoretical and abstract by doing a physical activity) (Barkley, 2010). While all three domains are not required simultaneously for active learning to occur, learning environments that integrate more than one domain are most effective and engaging.

Once a learner takes a test, the learner either will feel confident about his or her performance or fear the result. A post-exam review can prepare the learner more effectively for the next exam. To understand better the importance of post-exam reviews, it is necessary to explain how this approach fits in a framework that involves the concept of *self-regulated learning*. This kind of learning relies on three stages designed with an intent to maximize learning. First, self-regulated learning involves the conscious planning of a strategy *before* the learning task. Second, self-regulated learning includes the conscious monitoring of one's learning *during* the task. Third, this kind of learning employs the conscious evaluation of one's learning *after* the task (Nilsson, 2016).

A post-exam review, therefore, is rooted in the foundations of metacognition, which is defined as "the process of reflecting on and directing one's own thinking" (National Research Council, 2001, p. 78) — or "thinking about one's thinking." Metacognition is a dimension of self-regulated learning. Extensive research has shown that the development of metacognitive practices is a vital step in encouraging students to become self-directed or self-regulated learners (Owen, 2019). Metacognition has to do with reflecting on, monitoring, and controlling one's own knowledge and thoughts (Flavell, 1979), and is closely related to self-regulation, which involves the specific skills needed to engage in such reflection, monitoring, and control (Zimmerman & Schunk, 2011). When students are able to assess their own performance effectively, and adapt their approaches or strategies as needed, their learning improves (Delclos & Harrington, 1991). Self-regulated learning also involves the meta-emotional dimension, which means a learner should be open-minded in their learning efforts. The third dimension is environmental, which requires the learner to set up the best conditions for one's learning (Nilsson, 2016).

About the Test Autopsy

A test autopsy provides the learner an error analysis, essentially engaging the student to diagnose where mistakes might have been made while taking the test. Basically, it's a way of turning wrong answers into learning moments. The author offered a test autopsy as extra credit to students in two courses in spring 2019 and observed academic improvements among students overall on subsequent exams. Students—through informal conversations and course evaluations—expressed appreciation for these approaches.

After the instructor returned test grades to students, a test autopsy form was uploaded in the learning management system for students to access. The form was adapted from the Oregon State University Academic Success Center and included eight columns.[1] On the left side of the form, a student would enter the number to the question that was missed, how many points were lost and the type of the question item (e.g., multiple choice, fill in the blank, true/false, essay, etc.). Each of the next five columns is labeled with a reason as to why a student might have missed the question. Options include "careless," "unfamiliar with material," "misread the question," "didn't finish," and "other." The last option gives the student a chance to explain briefly why the question was missed if the other choices do not address the reason. Instructors can tailor their own form using any kind of computer software.

Completing the test autopsy form was voluntary for the learners; students were not required to submit a form. However, those who completed the form were awarded 5 extra-credit points on their exam score. Students conducting an autopsy of their test performance recognized their deficiencies, which enabled students to study for the next exam by regulating their test preparation.

Discussion and Considerations

Students come to college classrooms today unprepared for academic rigor. Not only are faculty expected to teach their discipline, but they also must prepare students for academic life. The post-exam reviews offer reflective opportunities for students. In fact, a post-exam review is just as important as a test review. The time after a test is an opportunity for the learner to analyze his or her performance and look for information about how to improve on future tests. By using a test autopsy form or other technique to analyze the questions missed, students can dissect where their errors might have occurred. Learners gain insights to help them determine what techniques or strategies might have helped and how to plan for the next test. A combination of reviews before and after an exam can help students improve their pathway of self-regulated learning. Students who are able to reflect on and learn from their

1 The form can be found online at this URL: https://success.oregonstate.edu/sites/success.oregonstate.edu/files/LearningCorner/Tools/test_autopsy_-_nilson.pdf.

test-taking experiences are more likely to make specific changes to their test-taking process--changes that will regulate their learning more effectively throughout their academic career.

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