

# The Benefits of Assessment | Dr. Sean Hutchins

Immediately. That's the word that got me kicked out of my fourth grade spelling bee. Disappointed as I was, one silver lining to the whole affair is that I will always remember how to spell 'immediately'. And that was doubtless the point of the whole endeavor. Teachers have long known that testing, when done well, is more than merely assigning a grade. Testing has both direct and indirect benefits for both students and educators, and there is now a great deal of scientific evidence to support the view that testing has a key role in the learning process itself.

Memory and learning have always been important domains of study in psychology. But in order to truly remember anything, it is important not only to be able to store something in your mind, but also to be able to retrieve it. Think of a misfiled book in a library- that information is still in there, but you won't be able to find it when you need to. And it's this aspect of memory, the retrieval, that is crucial to understanding the benefits of testing, because as it turns out, testing is one of the best ways we have of practicing retrieval. Study after study has shown that students who take tests to assess their competence retain information better than those who do not- in fact, testing helps the learning process even more than using that time for extra studying. Scientists call this effect test-enhanced learning, and it's been called "one of the most effective educational techniques discovered" (Pan and Rickard, 2018), with studies showing that testing can up to double retention.

There are several reasons why testing can have this outsize effect on performance. First, as already mentioned, testing is a highly effective way to practice retrieving knowledge- an aspect of memory that can often be neglected. Second, testing helps to re-activate and re-consolidate prior knowledge. Any time you recall something from memory, it lets your mind work with it in a new context, and gives a fresh opportunity to integrate that knowledge with everything else you know. This process, called reconsolidation, is important for forming stable and durable memories. (Incidentally, reconsolidation is also strongly supported by sleep, which is why getting a good night's rest can also help long-term memory). Finally, testing can help

performance because it strengthens our ability to find and use relevant cues. Cues are the tips and hints in the environment that can help us to retrieve the needed memories, kind of like tying a string around your finger. Testing can help us to recognize the cues all around us—including those given by the test or the situation—and to use those cues more effectively. For musicians, these cues can be especially important to performance: when performing a piece from memory, the aural cues from what has just been played are useful for helping to remember what comes next. This is why it is much more difficult to start a piece in the middle—those cues aren't there to help.

But beyond simple benefits for future performance, testing has been shown to lead to a deeper and more meaningful understanding of the material. Numerous studies have indicated that material that well-designed examinations will help students to better organize their knowledge, discovering deeper connections between different parts of the material and providing more opportunities to engage with the material. And it's this depth of processing that can enable transfer of knowledge beyond just the material studied. Transfer of knowledge means getting better at things that were not on the test, and it is one of the most important concepts in the fields of memory and learning. In fact, it really is the teacher's ultimate goal. The point isn't just to get better at reading one key signature or playing one particular piece- the goal is to be a better musician, to learn transferrable skills. It turns out that the increased retention from assessments of the material on that test also transfers to materials that weren't even on that test. That is, even untested materials get better just because part of the knowledge was assessed. However, it is also clear that this type of transfer requires a well-designed test, with meaningful feedback. A recent analysis of the scientific literature showed that transfer is most empowered when assessments provide the student with explanatory feedback that elaborate on the core concepts. This helps the student to scaffold their learning, find new applications for that knowledge, and even make inferences to related concepts. Well-considered assessment is crucial for this process.

In addition to the direct benefits of testing, using these kind of assessments as a part of the learning process also provides indirect benefits. Tests can be motivating for students, and there is evidence that students who know that they will be tested will study more intensively. The testing itself can also help the students with subsequent studying, by helping them to identify gaps in their knowledge. Analyses have shown that students who study without testing tend to be overconfident in their knowledge, whereas testing will help them to realize where they in fact need work. The students who are assessed will correct their errors, and will practice more effectively afterwards. Nor are teachers immune to this type of overconfidence. Teachers will consistently overestimate their own students' abilities, and outside assessments can lead to more effective pedagogy targeting their students' areas of need. And of course, these indirect benefits are above and beyond the effects of test-enhanced learning.

Now, music is of course different from studying for a history test, and music practice itself is a form of retrieval. In fact, this is part of what makes music so special- the fact that the music is retrieved and reconstructed each time is why each live performance is subtly different, and why even well-trained musicians still work to hone their craft. Musicians know that you can't practice just by studying the score- you have to actually play the piece! And this is the same reason why well-designed assessments can play such a powerful complementary role in developing a complete musician. In essence, it's like practice, supercharged. And the best part is that your students will begin to see the results immediatly. Er, "immediately".

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#### Selected references:

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