

IS INTUITION THE ENEMY OF TEACHING AND LEARNING?

Our own intuitions as to how we learn and how we should teach are not always correct, and can lead us to pick the wrong learning strategies. The problem with these faulty intuitions and biases is that they are notoriously difficult to correct.

The idea of relying on personal intuition versus expertise has long been debated in medicine. For example, much concern surrounds the use of vaccines, with one intuitive argument being that it is bad to put “chemicals” in the body (the counterargument, of course, is that even water is technically a “chemical”). Thankfully, for the most part, scientific expertise is winning the battle against intuition with regards to vaccination: for example, well over 90 percent of children in the US and the UK (where Megan and Yana grew up, respectively) are up to date with their

measles, mumps, and rubella vaccine by their second birthday (CDC, 2017; NHS, 2017).

When it comes to education, however, we seem to be much less inclined to turn to experts. In particular, there seems to be a huge distrust of any information that comes “from above.” Instead, there’s a preference for relying on our intuitions – be it teachers’, parents’, or students’ – about what’s best for learning.

One source of this tendency is that virtually every one of us has years of experience as a student, which leads us to trust our own intuitions more than we should. For example, in the UK and the US, 81 percent and 90 percent respectively of 25–64-year-olds have attained at least a secondary education (OECD, 2017), which means a majority of the citizens in these two countries have at least 13 years of experience in education. Further, becoming a primary or secondary teacher requires a bachelor’s degree; so, teachers are likely to have 17 years of experience as a student before entering a classroom, and we can hardly blame them for using this experience to inform their teaching practice.

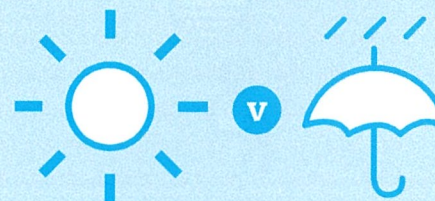


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Of course, experience as a student (and later, as a teacher) can be very valuable in building a teaching philosophy and practice. Unfortunately, however, our own intuitions as to how we learn and how we should teach are not always correct.

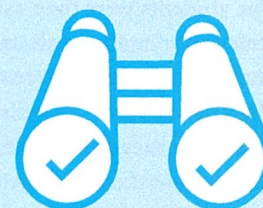
Moreover, the way we were taught in school may not be the best or most efficient way to learn. And despite being seasoned students, our intuitions about how much we have learned on a topic can often be misleading, too.

There are two major problems that arise from a reliance on intuition. The first is that our intuitions can lead us to pick the wrong learning strategies.



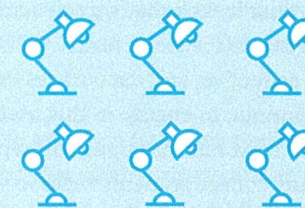
Our intuitions can lead us to pick the wrong learning strategies.

Second, once we land on a learning strategy, we tend to seek out “evidence” that favors the strategy we have picked, while ignoring evidence that refutes our intuitions (i.e., confirmation bias, which we discuss later on in this chapter).



Once we land on a learning strategy, we tend to seek out evidence that favors the strategy.

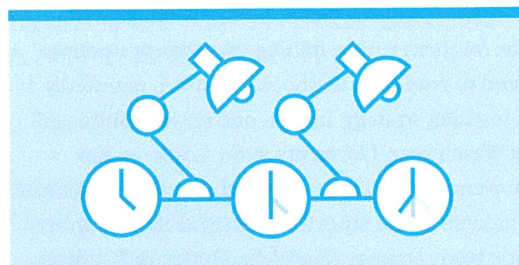
The first problem with intuition is evidenced by the frequent survey finding that college students tend to read their textbook and notes repeatedly as a learning strategy. In fact, one survey conducted at Washington University in St. Louis – a top university in the US – revealed that 55 percent of students utilize repeated reading as their number-one study strategy (Karpicke, Butler, & Roediger, 2009). Yet research indicates that repeated reading is not the best way to learn.



College students tend to read their textbook and notes repeatedly as a learning strategy, because it feels good.

There are many studies comparing what happens when students read portions of a textbook once, to what happens when students read those same textbook sections twice in a row. These experiments use a variety of different topics from textbooks, a variety of different types of learning assessments, and various delays from when the students read to when learning is assessed. Results from these studies overwhelmingly show that reading the textbook twice in a row takes extra time, but does not improve long-term retention of the information (Callendar & McDaniel, 2009).

But re-reading feels good. The more we read a passage, the more fluently we are able to read it. However, reading fluency does not mean we’re engaging with the information on a deep level,



Reading repeatedly takes extra time, but is less effective than retrieving information.

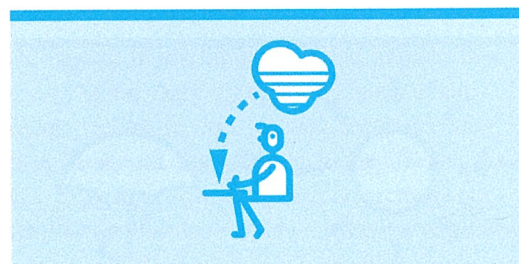
let alone learning it such that we can actually remember it and use it in the future. This feeling of fluency is seductive, and encourages the student to continue to engage in this useless strategy. If we trust our intuitions and repeatedly read – as many college students seem to – we will spend time engaging in a learning strategy that simply does not work in most cases, and certainly does not improve learning in the long run.

Ah, this looks familiar.
Yes, I remember this.
Yes, I know this stuff!



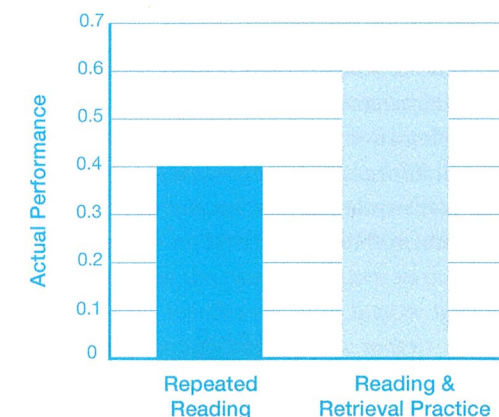
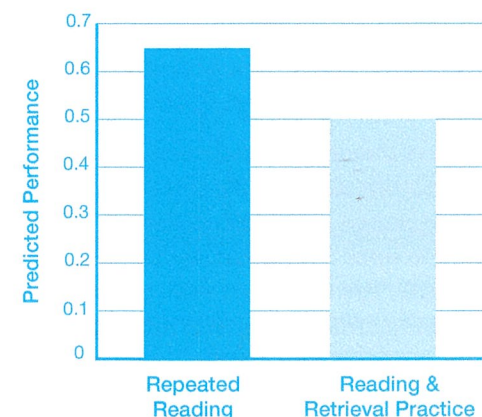
The finding that repeated reading does not improve learning may be surprising to you. Many of us have had the experience of reading

something twice, and feeling that we are “getting more out of it” the second time. Yet our predictions about how much we are learning are not accurate. When college students are asked to predict how much they think they are learning from repeated reading, many are extremely overconfident (Roediger & Karpicke, 2006). On the other hand, predictions made after engaging in more effective strategies – like answering practice questions or writing down everything you know about a topic – tend to be too low.



When students practice retrieving information, they predict poorer performance because it feels hard.

Roediger and Karpicke provide a striking example. Students learned a small section of a textbook by either reading four times or by reading once and then trying to write down everything they could remember from that text three times. The students were then asked to predict how much they had learned on a seven-point scale. They should have said ‘one’ if they thought they had hardly learned anything, and ‘seven’ if they thought they had learned it all. Students who had spent their time writing everything they could remember thought they had learned less than the students who spent their time reading and re-reading.



This graph shows predicted and actual learning after retrieval practice and re-reading. Data from Roediger & Karpicke (2006).

Then, one week later, the students took a learning assessment where they again had to write down everything they could remember, and got points for every piece of correct information that they wrote down. The students who practiced writing everything they knew during the first session could remember more of the information a week later than the students who read and re-read. Compare this performance to the predictions students made, and you will see a virtually mirror-like effect between predicted learning and actual learning. In other words, students’ intuitions led them to make faulty predictions about their learning. (See Chapter 10 for more about this experiment, and more about this effective study strategy.)

As college professors, we have seen this illusion baffle students. Occasionally students will come to see one of us in our offices – usually the students who often miss class and have not heard the spiel on effective learning strategies – and say they are unhappy with their performance in the class, and that they thought they aced a recent exam on which they actually scored quite

poorly. We ask them how they prepared for the exam, and they almost always tell us they “read the textbook and looked over all the notes.” They also often add that they “spent tons of time studying.”



At this point, we sit them down and remind them (or tell them for the first time, if they missed it) about the benefits of practicing retrieval for learning, and ask them to try it out. This is often met with much resistance – retrieval practice isn’t easy – but those who do try it are usually pleased with the results (Wallis & Morris, 2016).