



Welcome back to *The Bridge*, the monthly newsletter of the Center for Transformative Teaching and Learning. Each month *The Bridge* analyzes a specific aspect of teaching and learning through a Mind, Brain and Education Science research-informed lens.

The Home Stretch: maximizing student learning as the end of the year comes into view

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There is a magical feeling coming back from Spring Break and suddenly discovering that the end of the school year might actually happen. It might not actually be "in sight" yet, but there is something like the low rumbling you can feel before you see the helicopter or freight train approaching. It has been a long time since I have taught an AP class, so I do not have that ARGH! moment when I stare at all that I still have to cover and weep. Instead, it is time to start plotting the endgame.

So try filling out this template which comes from Chip and Dan Heath's book, *The Power of Moments*:

In 3-5 years from now, my students still know

_____ , are still able to do _____ or still find value in _____ .

To make progress on this, we need to plot a good endgame. This will be better if we remember "The 6 p's": proper planning prevents poor performance. So, with spring in my mind, what research informed seeds is it time to plant?

Make forgetting your friend

Your students will have forgotten an enormous amount during spring break. So use this to your advantage. The best time to review material is just as you are forgetting it. The esteemed UCLA psychology professor calls this an example of a 'desirable difficulty' -

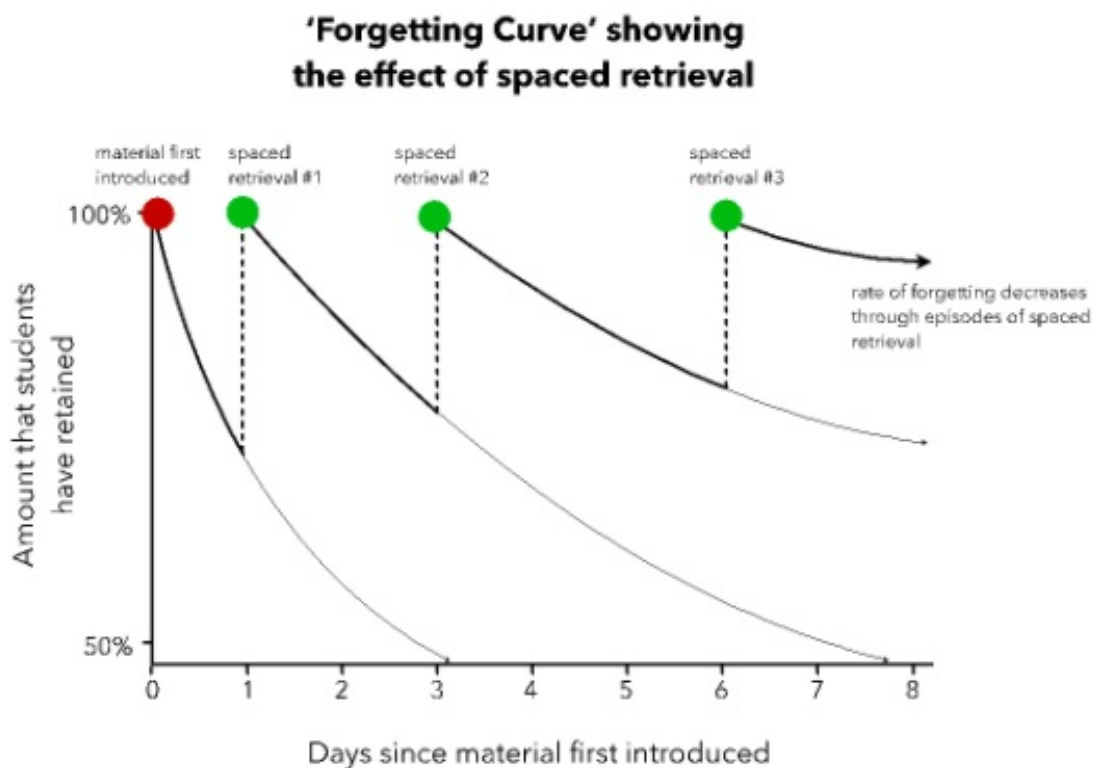
the very rustiness of the memory and the extra effort that the act of retrieving it requires helps it stick better in students' long term memory.

BUT doing this is not an enjoyable experience. In fact, students tend to hate it, and feel like it is not helping even when analysis of test data reveals that it is having a very positive effect. Maybe this is in part because they are not used to getting things wrong and not knowing stuff, but this is a topic for another day. Because of this, the teacher needs to find ways to incentivize doing so, or to build it into their planning.

Reviewing material over a longer period of time so that students remember more is called 'the spacing effect,' and it is one of the best research supported teaching and learning strategies. The research supporting it is very robust, it is one of the simplest things to implement, and the impact is likely to be worth the effort of doing so. Purposefully inject doses of the spacing effect into your lesson planning for the rest of the year.

Tell your students about the Ebbinghaus Forgetting Curve

The 'Ebbinghaus forgetting curve' is a visual representation of the spacing effect. Try showing it to your students and walk them through it: by letting yourself forget a bit and then review, you not only remember it again, but it sticks better in your long term memory. So the rate of forgetting - the slope on the graph - gets less and less steep over time.



**How long should you wait between episodes of spaced retrieval?
A good rule of thumb is wait until students are just forgetting it.**

The picture below shows another analogy: a 'desire line'. By repeatedly going over the same ground, you create an enduring path.



What should be reviewed?

You do not have to have spaced review of everything. That would be crazy - no one has time for that. But do take the time to identify the key ideas, facts, and skills you want your students to remember and make sure you have spaced review of these for the remainder of a year. Try planning this out on a calendar perhaps.

Spaced review of key ideas, facts and skills is a good idea even if you do not have a final exam. One way to think about it is: what do you want your students to still remember in September? Hopefully your answer is not, "It doesn't matter since they only need to know information until the end of my course." Pay particular attention to 'threshold concepts' - those gateway ideas that, once mastered, open up whole new vistas of learning.

Learning is the building of knowledge that is durable, usable, and flexible. If these are our aims, we need to be purposeful and strategic about how we do it and not just hope that our students pull it off. Start by identifying from your year with your kids what needs to be the most durable to help them be successful in the future, then use techniques to make this information stick.

What if I am doing an end of the year project, not an exam?

The same process of identifying key ideas, facts, and skills is still important in preparing students for projects, especially due to one of the main failings of project based learning. Research suggests that far more often than not, teachers overestimate the level of background knowledge and skills students have when entering the project and underestimate the level of background knowledge and skills necessary for them to be successful in the project. This leads to inefficient, ineffective learning for many students and a widening of the achievement gap. So which key ideas, facts and skills do you want your students to remember in September? And how can you craft a project that includes a good amount of these?

Time for some formative assessment

How do you know where your students are with their conceptual and factual understanding and with their key skills? Now is a great time for some formative assessment, in part so you can judge how much scaffolding you need to add to get them to where you want them to be by the end of the year. Analyzing the results of these formative assessments also helps you to set them final tasks that are sufficiently challenging, but not overwhelmingly so. This is true whether you are creating a final end of year assessment or not - it is about where your year with these kids ends up. It is really important to set a high bar for all your students and for them to know you are setting a high bar for all of them, but this point in the year is the perfect time to gather some data to figure out if the position of that bar should change.

It is also a great time for your students to know where they are, what they need to work on, and how their current strategies are working. It is great to find this out with enough time for them to do something about it. As always, pitch formative assessments like this: this is for me to figure out where you are, for *you* to figure out where you are, and for us *both* to do something different as a result.

Time for some reflection

Some time ago we talked about John Hattie's "Kenny Rogers Theory of Learning," that when you crunch all the data, it turns out that the most important factor for being a successful student is to use the right strategy at the right time. So how well do your students know whether they are using the right strategies for them or not? Again, it would be great for them to gain some insight into this while there is still some time to do something about it. What are some reflection and metacognition strategies for you? Can you go find some that your colleagues use and like and adapt them for your context?

Build a culture of active recall and self-testing as the end gets near

Self-testing and active recall methods are much better for building durable long term memory than simply rereading notes. Yes, even if you use ten different color highlighter pens. When rereading is done, do it after an episode of active recall, which could be as simple as taking a blank piece of paper and trying to write out everything you know on the topic. Even if the piece of paper remains blank at the end, the act of trying to recall is like creating little bits of Velcro in your brain for memories to stick to when you do go back and reread your notes. Practice questions, especially those with worked answers, is also a good form of self testing.

Using active recall to improve long term memory is referred to as 'the testing effect.' Like 'the spacing effect', 'the testing effect' is one of the strategies most robustly supported by research, most likely to have a positive impact, and most likely to have a sufficiently large impact to make it worth the time and energy cost of making it work in your class. Also, like the spacing effect, students tend to hate doing it, which is not surprising since it is much more effortful than simply rereading notes, and it is harder to get that lovely buzz of familiarity when you see something that seems familiar (which doesn't mean you have learned it; it just seems familiar, hence the term "illusion of fluency" coined by Mark McDaniel et al. in *Make it Stick*).

The testing effect and the spacing effect need to be at the core of what you do between now and the end of the school year. Building durable, usable, flexible knowledge is the goal.

Greatest Hits

It is possible that this sounds like a greatest hits collection - you have heard this

before. But in a way, that is the point. We are getting to the pointy end of the year. This time *really* matters for forming knowledge and skills that endure beyond the end of this school year. And to do so requires purposeful, creative application of our go-to research informed strategies. In some way, we as teachers are mirroring what we want our students to do by **using the right strategy at the right time**. There is a nice symmetry in that as we head into the home stretch.



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"My experience this summer at the CTTL was **transformative** for me. Even though I had a solid working knowledge of MBE I came away with so much more than I anticipated. I was able to take what I learned and immediately apply it to PD I am developing for my school system as well as use the knowledge I gained and connections I made to further my own deeper dive into MBE research based strategies. **This was by far the most rewarding professional development I have received as an educator.**"

Kent Wetzel, Monocacy Middle School, Frederick County Public Schools

"I enjoyed hearing from a variety of speakers on a range of topics as well as being a part of hands-on activities. I have never in my career had the opportunity to literally look at a brain in my hands so I can understand more about teaching, an experience they were excited to facilitate for us."

*Alleen George,
TFA Corps Member*

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