Eliminating the Tip of the Tongue

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Everyone at some point in time has racked their brain for the answer to a question, only to discover it awaiting merely imminent retrieval rather than being easily accessible. This common "tip of the tongue" phenomenon has been around for generations and means that the brain recalls some related information, but is unable to recall a particular portion of the information (Brown & McNeil, 1966). However, this is useless when one cannot determine the specific answer on an exam. In education, students are traditionally taught and then assessed afterward, making long-term memory retention essential. So what can teachers do to improve the retention of information in their classroom? In order to answer this seemingly simple question, we must first examine how our students remember information.

The three main components in remembering information are encoding, storage, and retrieval (Mastin, 2010). Before students can retrieve information from their memory, it must first be encoded and then stored. Items are stored in the brain by first passing through a buffer, and then getting encoded into the long-term memory. Every person has a different buffer capacity and it varies based on the difficulty of the task, but a general buffer capacity is from two to five items (Lehman & Malmberg, 2013). This means that teachers should keep the main topics covered during one class period below five if they want their students to encode each topic to memory. In order to enhance memory retrieval, the two factors that are most applicable to the classroom are chunking and maintenance rehearsal. Chunking is a term used when discussing associations made during the encoding stage. When trying to access certain information, the memory starts by targeting the topic or "chunk" of memory, allowing the rest of the information to be accessed through links to the topic. The stronger the associations or links made during encoding; the more likely it is that all of the information will be remembered (Lehman & Malmberg, 2013). Maintenance rehearsal on the other hand, can be equated to the amount of time spent studying. It is common knowledge that more time spent studying improves one's ability to recall the information, but simply studying information for hours on end isn't as effective as spreading out studying over days, weeks, or even months. There is research supporting this that states separating learning over time rather than all in one session maximizes long-term retention (Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006). This is why all students are encouraged to avoid cramming. After discovering that students will remember the information better if teachers limit the number of main topics covered, develop strong associations within each topic, and promote studying more often over time, there must be strategies that teachers can employ to accomplish these goals in the classroom.

Most teachers already do a good job of limiting the number of topics covered during a class period, but the buffer capacity stresses the importance of including summaries in their lesson plans. It's also important to note that items at the beginning and end of a list are remembered better than those in the middle (Lehman & Malmberg, 2013). Strategically placing these summaries at the beginning and/or end of class can make a significant difference for not only later in the year, but throughout their academic career. As far as developing strong associations within each topic, organizing lesson plans effectively will help make the links to the topic sturdier. The information being taught must be in the correct sequence, with logical titles and sub-topics. As a very basic example, imagine if a history class wasn't taught chronologically. The students would be more likely to mix up the information, or even forget it completely. As a supplement to effective organization, research shows that chunking not only occurs with item to item associations, but also with item to context associations (Lehman & Malmberg, 2013). Effective lesson plans should then not only emphasize connections between aspects of a topic, but when

possible incorporate context associations as well. Pneumonic devices, acronyms, and even catchy songs are just some of the strategies teachers can use to help their students create context associations in their memory. A biographical movie about an elementary classroom in Harlem provides a great example when the teacher gets his students to remember all of the presidents' names in chronological order by inserting them into a rap song (Cox, McNeil, & Haines, 2006). At the end of the year, the students still remember the song, and therefore all of the presidents. This is a great example of how context can improve the retention of information, as well as getting your students interested in the topic.

One of the biggest struggles for teachers is getting their students to study more frequently and avoid cramming. Most importantly, teachers should be enthusiastic and creative to get students to be interested in what they are studying. When students are interested like in the Harlem elementary classroom, they are more likely to keep up with the homework and spend time studying. On top of being enthusiastic and creative, another strategy teachers can employ is issuing more quizzes and tests. Research shows that repeated exposures and repeated testing, especially over time, lead to deeper knowledge and better retention (Bacon & Stewart, 2006). There have been several studies supporting this theory, especially in higher education. In post course surveys of an introductory accounting class, students felt that because of the daily quizzes they came to class more prepared. Also, they indicated that they were more motivated to keep up with assignments and readings (Braun & Sellers, 2012). As for daily quizzes' effectiveness in a k-12 environment, a controlled study was done in high school geometry classrooms. Given the same homework, exams, and teacher, two classes received a weekly quiz while two were issued daily quizzes. The average score in the daily quiz classes was 12% higher on homework and 9% higher on the final exam (Shirvani, 2009). Initially students might not like this classroom structure, but in another study 96% of the students who were issued daily quizzes ended up preferring that method and 100% of them thought that it led to more learning (Connor-Greene, 2000). As a bonus beyond simply promoting more frequent studying, the more often teachers give tests or quizzes, the more assessments they receive to keep tabs on the progress of their students.

After looking at how students remember information, improving the retention of that information becomes simpler. The solution is to limit the number of main topics covered each class period, organize lesson plans effectively, and issue quizzes more frequently. If successfully incorporated by teachers, their students will find the information readily available on exam day instead of merely on the tip of their tongue.

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