

Strategies for Increasing Learner Retention for Learning Transfer

The Knowledge Trappers:

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Introduction

Ask most students what they remember from a particular classroom and it will have more to do with the experience of learning than with some particular sort of information they found fascinating or easily memorable. For teachers that believe in the value of the information they share, it is important to consider various methods of presenting information in ways that help students to organize, prioritize, personalize, and contextualize it so they can remember it beyond the final exam. Tests are designed to measure short-term memory and the students' ability to remember or use certain predefined bits of information. However, once the test is over, many students leave the classroom with little hope of remembering anything that took place while they were there.

The four techniques presented here can help prevent such a disaster. The strategies outlined here can empower teachers to organize, prioritize, personalize, and contextualize the information they want to transfer in ways that will help students care about remembering what they learned. Mnemonics is a method of organizing information that takes advantage of natural memory patterns to help simplify the storage and retrieval process of information. Repetition helps students place a proper emphasis on the vital pieces of information and engage with them in various ways that make them naturally memorable. Case studies help bring ideas into every-day experience as students build memories of solving a particular problem and the details that surrounded it. Finally, YouTube videos offer a broader spectrum of communication that may help create a context for the ideas to stick.

Some of these techniques take a little bit more input from the teacher than simple lecture, but if the information is worth transferring, it is worth taking the time to teach it in a way that students will remember.

Mnemonics

Mnemonic devices reside in an area of long-term memory that is rarely discussed. This is due to the false perception that mnemonics are only used in small-scale subject matter. Many learners can remember the first mnemonic device they ever used: the alphabet song. The reality is that mnemonics are much more than that. A mnemonic can be any system, such as a pattern of letters, ideas, or associations, which assists in remembering something (Sykes, 1976). Mnemonic devices are highly effective tools for adult educators because they allow adult learners to associate new knowledge with stored information to increase memory retention.

Both long-term and short-term memories are based in biological systems. They are, however, theorized to be located in different areas of the brain. It appears that long-term memory may be stored as concepts throughout the entire brain. Opposed to short-term memory, which seems to be located in the hippocampus area of the brain (Walton, 2010). To access these concepts that are scattered throughout, adult learners have to sift through more information than their younger counterparts. There are several mnemonics that adults can use to access this information easier: acronyms, phrases, and chunking.

Acronyms can be used as mnemonic devices by taking the first letters of words or names that need to be remembered and developing an acronym ("Memory", 2010). A common example is a mnemonic phrase that is used for the order of operations in

algebra: “PEMDAS” which stands for Parentheses, Exponents, Multiplication, Division, Addition, and Subtraction. This mnemonic could be an important approach to mathematics by allowing the adult learner to break down larger operations into more “standard” verbiage that they can then disseminate into math knowledge. If the adult learner has problems working with acronyms, they may have more of a phrase-minded memory - this is where phrase mnemonic devices come into play.

Phrase mnemonics, also referred to as acrostics, are very similar to acronyms, but they appeal to adult learners who need to hear a spoken phrase as opposed to just an acronym (“Acrostic”, 2011). An adult educator could give this as a secondary way for their learner to retain knowledge as opposed to the acronym method. In the “PEMDAS” example, the educator would present this acronym as the phrase, “Please Excuse My Dear Aunt Sally.” Do not get this confused with the chunking mnemonic device. Acrostics are simply phrases that share a common first letter of each word with a subject that the adult learner needs to know.

Chunking, sometimes called “grouping”, is unique in the sense that most adults use this mnemonic without realizing it. Telephone numbers in the United States are a perfect example of this — 10 digits broken into 3 chunks, allowing almost everyone to remember an entire phone number with ease (“Memory”, 2010). This mnemonic is useful in the classroom by allowing the adult learner to organize information into more manageable groups. Adult educators can introduce the idea that a collection of elements having a strong association with one another is easier to remember than a collection with scattered information.

For teachers that find themselves dealing with lists of information, definitions, order of operations or similar types of material, mnemonics may be a valuable tool for learning retention. By taking a little bit of extra time to prepare, teachers can bring order to the random variables that they want students to remember. If they are short on time, it may be easier to give students the opportunity of arranging the information in ways they think will be more memorable. Perhaps the teacher could even use this as an opportunity to teach students how to use acronyms, phrase mnemonics, and chunking in ways that will serve the students well beyond their days in the classroom. If the teacher used this learning device regularly in a variety of situations, students would pick up on its value and remember its function because of another learning method known as repetition.

Repetition

Repetition is a useful way to increase learner retention of skills and long-term memory. Using repetition can help to make a skill routine and store information in the student's subconscious mind.

The first step to effective use of repetition for learning as a teacher is to ensure one's own mastery of the subject. The facilitator needs to be a master of the trait. In order for repetition retention to work, the teacher must get the students to consistently think about the skill or trait they wish to learn. The students do not have to act out the repetition, but having it consciously in their head will help with retention.

The next step is to start practicing the skill. Best results are seen when a skill is practiced multiple times a week. As the days and weeks go on, the skill will get better.

The activity will become easier, and the material will start to be stored subconsciously in a more permanent location in the mind.

Most students used repetition as a part of skill retention at a young age while learning to ride a bicycle. At first they were not able to ride the bicycle, but with practice and repetition they were able to remove the training wheels and ride with ease. Once the skill improves enough, the students no longer needed to consciously think about the activity. At that point, the skill had been cemented into long-term memory and was sitting in the subconscious ready to be recalled at anytime. This is where the old saying of “once you learn how to ride a bike, you will always be able to ride a bike” comes from. “Repetition ensures that students can carry out complex assignments with some opportunities for failure and additional opportunities to reflect on those failures and try again for success” (Kahn, 2013, p. 49).

Adult educators can incorporate repetition for the use of learner retention in many different ways. The use of demonstration and simulation is a great option. Learning is a combination of knowledge and skills. “Demonstration of the skills is often required in order for the learner to fully comprehend as well as apply the new knowledge, competencies, skills, concepts, and/or truths” (Galbraith, 2004, p.362). Once the skill has been demonstrated, the facilitator can create simulations. Demonstrations and simulations are consistently used in the fire and medical services. Once the instructor has demonstrated the skill and created the simulation, the students repeatedly engage in the simulation. Through these repetitions, the skill will be permanently stored in the subconscious where it is available for instant recall.

The use of repetition for skill retention is an important strategy for a facilitator to incorporate into their teaching/learning process. In his book *Working Memory and Academic Learning*, Milton Dehn stated, “The probability of long-term storage is a function of how many times an item enters working memory. Thus, repeated practice and review is an effective instructional method for all students” (Dehn, 2008, p.124). This is the power of learning by using repetition to enhance long-term memory in the classrooms and on the training grounds.

Case Studies

Case studies are another example of using working memory to help students with learning retention and transfer. When a student is forced to grapple with an idea on a personal level, his or her working memory is engaged in the development of knowledge and skills through experiential learning. When the case study is introduced, the students are given the opportunity to utilize their knowledge to analyze the current material presented. The teacher’s goal is to “either provide [a] new experience or ...help [the] learner reinterpret their prior experience” (Marsick, 2004, p.383). Ultimately, the participant should be able to create new associations for future problem-solving or critical thinking needed in their careers or organizations.

In order to deliver a useful case study, the following items should be developed based on the learner’s needs: the objectives, delivery, and evaluation process. Once the objectives and course outline are created, then attention should be turned to the creation of a stable case report. Case reports should be based on reality with enough detail to

support research and stimulate a variety of perspectives. (See Appendix A for a sample Case Study).

Case studies should also be designed with relation to the amount of time available within the course. For example, a course that is only 1 hour in length may require a simpler case study with one or two discussion questions that can be completed easily. It is also possible to take a more extensive case study and build it in complexity over several class days, or require the completion of pre-course work prior to the meeting time. Positioning within the curriculum should be based on desired outcomes. They can be utilized to introduce new theories, or delivered at the end of the curriculum to synthesize new ideas and instigate problem solving through critical thinking.

Prior to presenting a case, it is valuable to review the dynamics within the classroom and divide the members into groups accordingly. Clarify the roles of not only the members of the groups, but of yourself as a leader. If you are attempting to stimulate reality, then your role is to guide. However, if the purpose is to define a solution or the naturalization of a skill then it may be necessary to provide continual feedback. Ensure that the instructions are understood to begin the analysis of the case study and rotate throughout the groups to answer questions and guide as needed.

The next component of the case study is a discussion or debriefing, which can be facilitated through the use of open-ended questions that explore all facets of the case from every angle possible. It may be necessary to list concepts on the board to help guide an organized discussion. In the concluding moments, ask the students to summarize their final analysis and validate that all objectives have been covered.

The last part of the case study is the evaluation, which will be dependent on the required outcomes of the course. These results could include: identifying and analyzing the problem, implementation of solutions, reasoning skills, clear presentation of information, teamwork, communication skills, and group interaction. It is also possible to evaluate the case through the use of feedback surveys or individual learning audits.

Case studies are an excellent way to encourage students to initiate their responsibility into the learning environment. They allow the student “time to reflect and think more critically than they might under pressure” (Marsick, 2004, p. 397). By encompassing experiential learning with a well-researched and real-to-life case, the participant is more likely to cultivate the aptitudes required outside the classroom to become proficient in the knowledge and skills needed to succeed in their chosen profession.

YouTube

The final strategy given for increasing learner retention and learning transfer finds its value in providing a context for student learning. Why should a student care about a particular piece of information? Where case studies build on previous experience, YouTube can provide the building block of experience with a subject in a way that students will not easily forget.

Since its launch in 2005, YouTube has become an important part of contemporary entertainment, interaction, negotiation, cultural expression, cultural creation, (Bou-Franch, Lorenzo-Dus, & Blitvich, 2012), research, social construction, and global understanding (Gerber & Scott, 2007). Fortunately for educators, YouTube has also

become a “promising learning resource for students and the general public” (Azer, S., AlGrain, H., AlKhelaif, R., & AlEshaiwi, S. (2013). In fact, medical students begin their research with YouTube (p. 2). With over 700,000 videos on www.YouTube.com/education, (<https://www.youtube.com/user/teachers/about>), facilitators can find multimedia presentations on almost any area of interest for their students, focusing on detailed content, or providing "a sense of the big picture and how things fit together" (Schoenfeld, 1999, p. 170).

“People learn more deeply from words and pictures than from words alone,” (Mayer, 2005, p. 31). On average, people can only remember twenty percent of the information they take in auditorily (Bowman, 2002). Multimedia, meaning any presentation that involves spoken and written text and images” (Muller & Reimann, 2007, p. 2), presents verbal and visual images in close proximity to each other. This reduces cognitive load because the audio and visual processing systems of the brain are separate, with their own capacity limits. (Schweppe & Rummer, 2013). Though choosing multimedia with exciting elements can generate student interest, a “motivational, non-cognitive outcome,” a simpler design enhances information processing, the building of accurate mental schemas, and learning transfer (Belenky & Schalk, 2014, p. 35).

Providing a basic framework before the presentation gives students a sense of context and a foundation on which to build when they view the presentation (Day & Goldstone, 2012 and Moreland, Dansereau, & Chmielewski, 2007). As learners use working memory to build connections between the spoken text, graphics, and prior knowledge from long term memory (Mayer, 2005), they reinterpret and expand their

original knowledge (Day & Goldstone, 2012), encoding a “new long-term memory trace” (Schweppe & Rummer, 2013).

To prevent a disconnect, many facilitators use “concreteness fading”, which begins with grounded examples and moves toward abstract ones or morphs between them (Belenky & Shalk, 2014; Day & Goldstone, 2012; Scheiter, Gerjets, & Schuh, 2010). Using concreteness fading to make obvious, then eliminate, seductive but distracting details is also an important part of giving students the opportunity to create internal representations without irrelevant or erroneous components that could hinder later learning transfer (Belenky & Schalk, 2014, p. 42). For a step-by-step example of integrating this concept in an ESL classroom, please see Appendix B.

Facilitators can now choose from myriad educational multimedia presentations on YouTube, and edit them to fit their learners’ needs. Incorporating them into active-learning modules enhances the integration process. The additional use of concreteness fading can foster the internal and external directionality that develops the metacognitive skills necessary for superior learning transfer (Mayer, 2005).

Conclusion

As demonstrated by these four methods, improving learning transfer and student retention of information does not have to be difficult. Mnemonics can provide a simple way of organizing information for easier storage and recall. Repetition can take ideas beyond short-term memory and encode them in the subconscious part of the brain for instant recall. Case studies can take advantage of working memory to personalize the experience of learning helping students remember the process and details. And finally, Youtube

videos can provide a foundational building block of a context for learning that gives value to the information students need to know.

By taking a little bit more time to create this value for students teachers can insure that the value of the student's learning experience continues beyond the classroom and into every-day life. Not everything needs to be remembered long-term, but these tools can help teachers organize, prioritize, personalize, and contextualize the information they believe is vital for learners to remember.

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Appendix A - Sample Case Study

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This is a case study I introduced to my students this past week. My class of twelve students have been working on each of the individual components that led up to this case. The purpose is to instigate critical thinking and synthesize new ideas to problem solve a real-to-life patient encounter.

Students were allowed to work as one large team on this project. One student volunteered to lead the group, one began recording the process on the board, and the remaining ten students assisted in the discussion and problem solving process. I created fourteen other case studies like this one and rotated out the team leader and recorder positions so that all students had the opportunity to participate.

My goal as a facilitator was to keep the project moving in a forward motion. I answered questions after the students sought three other alternatives “three before me,” stimulated further discussions, and lead the debriefing questions. The case studies were presented on a PowerPoint Presentation and I manually advanced them as they answered the questions.

Objectives

- Describe the indications, complications, sequence, and equipment for rapid sequence intubation (RSI) with a neuromuscular blockade.
- Identify the neuromuscular blocking drugs and other agents used in rapid-sequence intubation (RSI).
- Defend the necessity of establishing and/or maintaining patency of a patient's airway

Case Study

- You arrive at an outlying facility to transport a 35-year-old female who has been involved in a motor vehicle collision.
- What kind of information would you like to know?
- What kind of equipment should you collect and prepare?
- She has suffered bilateral femur fractures and a pelvic fracture. She also has a large hematoma to the right temporal area.
- She is 90 kilograms with a history of end stage renal disease.
- What concerns or considerations do you have at this point?
- What questions do you have for the transferring physician?
- Prior to your arrival at the sending facility, the patient received 6 units of Packed Red Blood Cells (PRBC's) for her extreme blood loss. The CT shows a biconvex hyperdense shape in the right temporal region. Hemodialysis completed yesterday. Blood Gases & Chemistries have been ordered.
- Her vital signs are as follows: Blood Pressure – 86/44, Heart Rate – 130, Respiratory Rate – 28, Oxygen Saturation is 92% on 100% oxygen via non-rebreather mask.
- She arouses to painful stimuli and is combative. She has been fully immobilized, and the receiving facility is 1.5 hours away. Aeromedical transport is not an option.
- Does this patient require airway management? Why?

- Is this patient a candidate for RSI?
- What medications will you use?
- Do you have concerns for the use of Succinylcholine? What are they?
- Why would Lidocaine be indicated for this patient?
- What sedation medication is best? Why?
- In what order will the medications be given, and what are the dosages?

Evaluation Process:

- Student Learning Audit/Survey
- Group participation/Teamwork

Appendix B – Sample YouTube/Concreteness Fading Exercise

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This is an example learning module that fully supports long term memory and learning transfer via concreteness fading for an ABE or ESL English class.

1. Prior to class, the instructor uses ED Puzzle (a free tool for teachers at www.EdPuzzle.com) to access the YouTube video: <http://www.youtube.com/watch?v=uBoHhftIkII>. He or she uses ED Puzzle to remove the first few seconds of the video which refer to a former lesson these students did not have. He or she interjects two audio tags which clarify the information in the video.
2. The instructor presents a spelling list along with applicable rules about dropping the e at the end of a word, doubling the consonant, and adding ing.
3. The students take a few minutes to make up nonsense words, then add the ing ending to them, following the spelling rules.
4. The students watch the YouTube video in class or at home.
5. The students individually choose between one of three activities: a. drawing a pictorial representation of one or more of the words being transformed by the spelling rules (such as mixing together several odd ingredients to represent the “oddball” word Mixing, which does not follow the spelling rules); writing a short, descriptive story about one or more of

the words on the list; or creating one or more humorous Vines (trendy 6 second videos, creatable with a free application, see <https://vine.co/>).

6. One or more students volunteer to loop the vines created by their classmates as a home project and upload it to a class YouTube channel.

7. The class watches the Vine together and any students who care to share their drawing or story do so.