How to Study Effectively

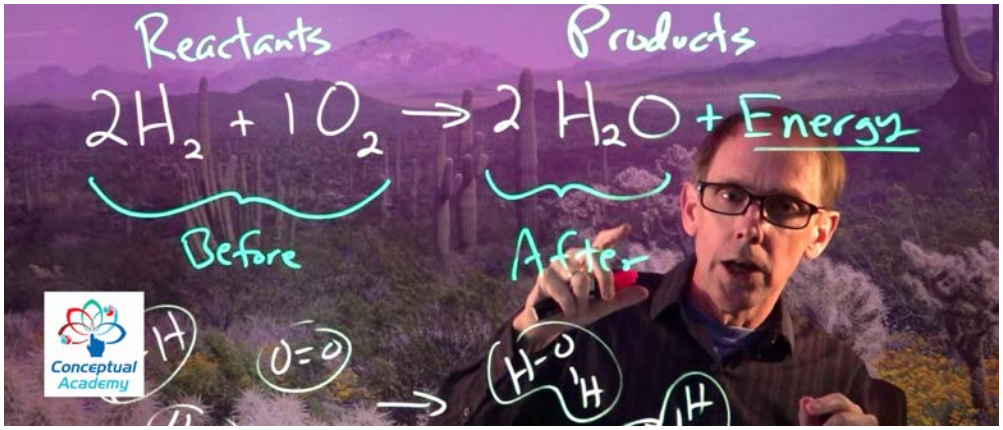
By John Suchocki, Ph.D.
St. Michael's College
ConceptualAcademy.com

Cheetahs are built to run
Fish are built to swim
Humans are built to _____ *

Preface

For those interested in learning, here is a treasure of a book: *Make It Stick: The Science of Successful Learning* by Peter C. Brown, Henry L. Roediger III, and Mark A. McDaniel (Harvard University Press, 2014). There have been remarkable recent discoveries in cognitive science. *Make It Stick* compiles these discoveries and shows how they can be applied to the everyday world of education with astonishing results.

What follows is a summary of not only my own experiences as a college professor, but also of the major points highlighted in *Make It Stick*. If this presentation on "How to Study Effectively" inspires you to obtain your own copy of *Make It Stick*, then my efforts have been successful.



John Suchocki – Founder, Conceptual Academy, PBC

* "Solve problems" is a great answer as well as funny, but this article is looking for another answer. Keep reading.

Part 1: Developing Your Potential

The first step to studying effectively is to push back any ideas you may have about being limited in your ability to learn. An exceptional set of "smart" genes is not required for any healthy individual to achieve mastery in any chosen field. What IS required is effort. This includes down-to-Earth self-discipline and persistence. Cognitive science tells us that these exertions change the brain's structure creating new connections and capabilities. Importantly, learning builds upon itself, so the more you learn, the more you can learn. We each have great potential. What matters most is the degree to which we are inspired to develop this potential.

Kinds of Memory

Broadly speaking, we have two kinds of memory: short and long, each held at a different location in the brain. Short-term memory, often referred to as "working memory", is your capacity to hold onto ideas and relationships within an immediate time frame. Most all of us are severely limited in our short-term memory, which is leaky by design. This is to say it's not a fault that your short-term memory is limited. Rather it's a feature. We live in the now. We always have. And we always will. It's easier to make sense of the now without the distractions of the zillion things that have happened in the past and the zillion things that could happen in the future.

Aside from a good sleep and general health, there's not much any of us can do to increase our short-term working memory. But this should not be of concern. The size of one's working memory is pale in comparison to the capacity of one's long-term memory.

Long-term memory is that reservoir of knowledge and skills residing outside our conscious thought. While short-term memory is limited (by design), our potential for building long-term memories is substantial, if not boundless.

When we talk about learning, we're talking about *consolidating* information that passes through short-term memory into that huge reservoir of long-term memory. Consolidation has its beginnings as you are first introduced to new information. The memory, however, remains tenuous unless you start to work with that information, which can include articulating that information in your own words.

With learning, however, there's much more involved than just lodging a new thought into some corner of the brain. No thought exists in a vacuum. Rather each thought is pretty well defined by all the surrounding thoughts. In addition to securing a thought to memory, you need the opportunity to build the connections between the new thought and older ones—the new idea needs to be personalized in the context of what you already know. Experience is perhaps the best avenue to the building of these connections, which is how hands-on activities and group interactions can be so effective at strengthening one's ability to learn.

Seeking Effective Strategies

There are strategies you think might work well, but actually don't. Reading a textbook chapter multiples times is a good example. Say you have an exam coming up. In all diligence, you read the assigned textbook chapter not once, but three times. Shouldn't this provide for effective learning? The answer is no. By the third reading you've become fluent in the topics covered. You are then likely to misinterpret that fluency for actual understanding. Fluency and understanding are not the same thing. For example, you might be able to recite a famous poem flawlessly, but still have no idea about the underlying meaning of that poem.

Think about this: Are you able to answer the questions at the back of the textbook chapter? With the textbook closed, can you articulate the ideas within that textbook to someone else? By just passively reading without applying the ideas yourself, it's unlikely you have yet mastered the material. Furthermore, the clarity of the textbook passages has fooled you into thinking otherwise. With your confidence raised from having read the chapter three times, you are unlikely to take the next and much harder step of consolidating the new material into your long-term memory, which occurs as you try to retrieve, apply, or articulate the material. Your read-only strategy has placed you in an odd position of not knowing that you don't know the material. The shock comes when you look at the exam questions, which seem incomprehensible.

A better strategy is to read the chapter only once. Spend the rest of your time working on the exam-like questions in the back of the chapter. Better still, you should

spend the mental energy it takes to articulate (aloud) what you think you learned by having read the chapter. But perhaps this is more mental energy than you are willing to spend. If so, consider this: When learning is easy, so is forgetting. What all effective strategies have in common is the higher level of effort they require. It's only with that higher level of effort that the learning becomes durable.

A Two-Step Process

Learning is a two-step process. The first step is being introduced to the material. This is an *input process* that is relatively easy to accomplish. Examples include reading a textbook, attending a lecture, or watching a video lesson. This leads to a temporary view of the overarching picture. The second step is trying to express that material yourself. This is an *output process* that requires a significant amount of additional effort. Examples include, solving problems related to the material or re-articulating the ideas to a friend. This leads to a nuanced, deeper, and more durable understanding of the material. All that you don't know quickly becomes apparent. This can be uncomfortable and discouraging. It may also feel unproductive. But it's the beginning of the path to understanding, which also leads to better exam scores.

Reading a textbook chapter three times is not necessarily a "bad" approach. It is however, an incomplete approach because it only involves the first step. For any learning strategy to be effective, it must encompass both steps—input followed by output. Furthermore, you'll find that more effective learning strategies have a stronger emphasis on the more difficult second step. It's this second step that is the most effective in achieving the two goals laid out earlier: placing new information into long-term memory, and strengthening the communications between our short and long-term memory banks.

Learning is not a simple process of "receive and you shall absorb", as though we were computers. Rather, learning requires effort. This includes self-discipline and persistence. No one is exempt. That's the hard news.

The exciting news is that within each of us there lies this massive potential. We can become "smarter". In fact, as described in *Make It Stick*, over the past century average IQ's have risen. As measured on standardized IQ tests, an IQ of 100 today would equal

that of an IQ of 118 about 80 years ago. This increase in our overall "smartness" is attributed to improvements in nutrition as well as the fact that we live in a much more intellectually stimulating environment.

How smart you are or wish to be is less a matter of genetic destiny and more a matter of whether or not you live in a social environment that values and supports learning. You have great potential. We all do. That's what makes us human. We are all built to learn. That's what allows us to recognize connections, like you did right now regarding the riddle at the start of this article.

Part 2 Effective Study Techniques

What follows are specific techniques students can use to study more effectively. What they all have in common is they each require a level of effort. The main barrier to learning, in most cases, is finding the energy and motivation to exert this added effort. Good health, a good night's sleep, supportive friends, and an enthusiastic instructor can go a long way in this regard, and the best place to begin is with each of these. But then what? Once you're committed to learning, what are the "best practices"? Those best practices are spelled out in the paragraphs that follow. This is advice every student deserves to hear.

The Textbook

While reading a textbook you may look forward to getting to the end of the chapter. So, you read as fast as possible. Slowing down may be the last thing you want to do. Yet, in this case, slowing down will not only save you time, it will increase your performance on quizzes and exams.

If it's a thick novel that needs to be read within a short time span, then that's another story. Of concern here is the traditional textbook containing densely written paragraphs rich with new information. Such a textbook is best read slowly. And while you're reading, it's important to pause periodically to try to rephrase in your own words what you think you just learned.

Throw away your highlighter. You'll serve yourself much better by writing notes that summarize what you've learned. Do this on a separate piece of paper in a notebook, which you can study as a reference the night before the exam.

Don't read the chapter straight through more than once. Repeated readings are worse than a waste of time. Repeated readings improve familiarity with the slick passages written by the author (not you) and can lead to a false sense of command over the material. This may encourage you to make the mistake of ending your studies when, in reality, you've only just begun.

Your textbook will likely have questions at the back of each chapter as well as within the chapter. Follow a 50:50 rule. For as much time as you spend reading, that's the least amount of time you should spend on these questions. If it's a choice between reading the textbook or working on the questions, then work on questions. But don't spend all your time looking up the answers. Rather, it's imperative you first try answering each question on your own, aloud or in writing. You need to integrate this "step 2" experience for your learning to be truly effective.

The Lecture

Many students will wait until after the lecture to read the textbook. A reason for this is because the lecture presentation (be it live or by video) provides context. The textbook is difficult to comprehend as it is. But after hearing and watching a good lecture, the sentences begin to make more sense. There's nothing wrong with this. Except, when you are first introduced to material, you are less likely to have questions. The reason for this is because you have entered "input mode" where you find yourself trying to absorb as much as you can with the hope of making sense of it later. That's right: later. It's only after you've begun to grapple with the information that meaningful questions start to arise. If you read the textbook or watch the videos before class, then during class is when those questions likely arise. Your instructor will be there to help you.

A far better scenario is now coming about with the growing number of "hybrid" or "flipped" courses where the lectures have been posted online. Students thus have access to both the textbook and the lectures before coming to class. In such a situation, class time can transform into a glorified study session. Students engage with their peers,

articulating what they think they understand, under the expert guidance of the course instructor. This takes advantage of the fact that everyone has come together to be in the same place at the same time. Coming together to hear a lecture performance is fine. But learning thrives with face-to-face interactions. A class with students interacting with each other along with the instructor has many advantages.

Practice Retrieving

Today, lectures (online or live) and the textbook are the primary means of delivering academic content to the student. But once delivered, how is the student best able to commit that content to memory? An effective means is to retrieve that content from memory. Every time you recall a memory, you strengthen its placement in long-term memory as well as the channels that allow you to access that long-term memory.

While reading, you should periodically pause to explain in your own words what you think you just learned. This may feel awkward and frustrating, but it's far more productive than the passive act of highlighting sentences. Answering even the simplest of questions, say, those found in your textbook, have value in that they force you to recall the ideas. It's the act of recalling that counts. The ultimate question you can ask repeatedly with consistently great results is: What did I just learn?

Consider also why it is that everyone breathes with a sigh of relief when a student within a class is bold enough to ask a question of the lecturing instructor. Everyone. That includes the instructor. The question brought up by the student allows for a pause. It allows for reflection. It allows everyone to be asking themselves: "What did I just learn?" Indeed, which would you rather have: a straight 50 minute lecture with no interruptions? Or a 50 minute lecture punctuated by periodic questions? So the next time your instructor asks: "Any questions?". Do yourself and every one a favor by putting yourself forward to ask a question no matter how silly it may seem. It will allow you and everyone else the opportunity to "practice retrieving" that which was just presented. All will benefit, just as the rising tide lifts all boats.

Space Out Retrieval Practice

Imagine you have a stack of 30 new terms to memorize. You might be tempted to nail them all down in a single session. You single-mindedly test yourself on these terms over and over until it feels like you know them rock solid. This feels good. This feels like it has prepared you well.

Except there's a significant problem most people don't recognize. Repetitive practice relies heavily on short-term memory, which is not the tool of choice for durable learning. A more effective strategy is to get to the point where these 30 terms are "almost" committed to memory. This may feel like a lazy approach, and this may feel unproductive. But you're not yet done. You take a break, long enough for some forgetting to occur. Depending on the task, this may be a few minutes or even a few days. Then you study the terms again, but you start by recalling as many as you can. The very process of retrieving each term strengthens the neuronal connections between your short and long-term memory banks.

So, there's value in forgetting. It allows you to choose what you want to have readily available in long-term memory. If it's important, you'll be acting to recall it periodically. If it's not important, it fades to the background lying in wait for some future calling.

Long-term memory has a huge capacity. But the connections between each stored memory and our working memory require maintenance. For example, if there is information you need to retain for the long term, then it's important that you refresh your working memory of it periodically. This is why real estate agents, pharmacists, CPA's, physicians, airplane pilots, lawyers, electricians, and those in many other professions require regular re-certification through educational programs. They need these programs to assure continued proficiency and skill.

Interleaving

It's Sunday evening. You have a history exam on Tuesday and a chemistry exam on Thursday. How should you use your time? You may use Sunday and Monday to study exclusively for the history exam. Then for Tuesday and Wednesday you'll focus on the

upcoming chemistry exam. You might not even question whether there's a more efficient approach. But there is.

As described earlier, single-minded focus on a single topic only goes so far. With such a narrow focus it may feel like you are attaining mastery, but this is an illusion. Your brain needs time to digest, process, and re-structure the material. For learning to be effective, it's best not to saturate your system with input and that's exactly what you are doing with a full-blown focus on a single topic. Repeating a lesson over and over will not burn that lesson into long-term memory. For that to happen, you need to 1) introduce yourself to the content, and then 2) let it go. Forgetting will occur, but as mentioned, this will be an opportunity for you to cement the ideas later as you try to recall these ideas, re-looking at the textbook only as truly needed.

An amazing feature of the human brain is that it works on many levels, including conscious and subconscious. While you're doing other things, including sleep, you may think you're not working on learning, but you are. That's what the brain does incessantly. To maximize your study efficiency, you can take advantage of this mysterious behavior.

To make matters even better, while all this is going on in the background, your working memory is idle but ready to go with the next task at hand not slowed down in the least by the fact you just finished studying another subject. In fact, a new subject is welcomed for its fresh ideas.

It's Sunday evening. Because the history exam is closer, you might start with history. After 90 minutes you take a short break. When you return, you look at the chemistry, primarily an overview of what you're going to need to know by next Thursday. You spend no more than an hour on this followed by a 30-minute retrieval session on the history you began earlier that evening.

What you are doing here is called "interleaving", which means you are switching topics within a single study period. Interleaving is highly effective because it makes great use of various quirks in how our brains work. Primarily, our long-term memory banks have expansive capacities—they won't get overloaded as does short-term memory. Also, it allows for the spacing needed for the brain to strengthen the long-term memory connections, much of which occurs behind the scenes, but especially as you work to recall the information later. Though effective, interleaving is also counter-

intuitive. *It's telling you that you will learn better by forgetting and that you will learn better by bringing up the distraction of another subject.* That interleaving goes against common sense leads many to miss out on its benefits.

If you have a single exam coming up, there will likely be many different topics you need to cover for that one exam. Should you focus on one topic, nail it down, and then move onto the next? The effectiveness of interleaving tells us that it's more efficient to stop once you achieve a rudimentary understanding for any one topic. Move on to another topic and do the same. When you re-visit each topic, start by asking yourself everything you can remember about it. Then review the actual content to confirm or correct your understandings and also to probe deeper.

Key is not over-studying a topic in a single session followed by allowing time for some forgetting to occur. In a subsequent session, you retrieve what you can remember and confirm or correct the accuracy of your understandings. Follow this sequence repeatedly and you should see marked improvements in your ability to retain what you need to retain.

Mnemonics

There may be an idea planted somewhere in your mind. The more you practice retrieval, the easier it will be for you to recall that idea. But there is another route to recalling information known as *mnemonics*, after the Greek word for memory. For example, in chemistry we learn that bases accept protons and acids donate them. Who does what can be confusing so we create a mnemonic to help us out: BAAD, **b**ases **a**ccept, **a**cids **d**onate.

Memory champions can instantly recite back long strings of numerals. They do so not by some powerful working memory. Rather they have developed (through a lot of effort) a powerful system of mnemonics that taps into the human brain's great capacity for stories. Through their mnemonics, they translate the string of numerals into a story, albeit an absurd one. When they recite back the string of numerals, they are merely translating this story back into numeral form.

Many of us also have good spatial skills along with a sense of geographic location. This allows for the building of a "memory palace" where each room in the palace

represents a main idea. The furniture and articles of the room represent subsets of ideas. To recall these ideas, in your minds-eye, you walk into the room and just look and there they are.

While mnemonic techniques such as these have value, they are not to be mistaken for the actual ideas themselves, which still need to be stored into long-term memory through effortful means. The mnemonics, however, can be helpful for keeping these ideas organized and more easily retrieved. The mnemonics work particularly well when the nature of the learning is primarily rote memorization, say of the bones of the human body. Of course, rote memorization is no testament to a student's actual understanding of the material. You can memorize all the formulas in physics and still not know what they mean or how to use them.

Elaboration

To "elaborate" is to explore further. You can do this by finding the connections between the new ideas and your everyday world. For example, in my classroom discussions of gravity, I typically describe a free-falling elevator. The occupant pulls out his pen, lets it go, and sees that he and his pen are falling side-by-side. The pen, from his point of view, appears to float. This is exactly what happens in an orbiting space station, except the station, and all objects within it, are also moving sideways at 17,500 mph so they fall around the Earth and not into it.

I recall one semester a student later telling me how the pen in that story nailed it for him. The pen was a "handle" he could use to grasp the concept of orbital motion. The story itself is an "elaboration" that connects an idea—orbital motion—to the everyday world: pens and elevators.

When you draw a concept map, you are elaborating. When you write a cheat sheet for an exam, you are elaborating. As you elaborate, you are helping your long-term memory build an address within your brain.

As mentioned earlier, no thought exists in a vacuum. Rather each thought is pretty well defined by all the surrounding thoughts. Our brains work by relating this to that and that to this. If you are to place new information into your brain, then this new

information needs to have a location relative to other information already existing. How can you fit a new idea into an already existing scaffolding of ideas? Elaborate. You don't just soak up an idea. You need to actively elaborate on that idea.

This is worth restating: Our long-term memory is like a scaffolding of ideas. To introduce a new idea is to find a place to hang that idea within an already existing scaffold. But as you attach the new idea, you necessarily increase the size of the scaffold. This in turn facilitates the incorporation of even more ideas. Learning becomes more efficient simply because it's easier to find a context for each new idea. Thus, the more you know, the more you can know. The smart just keep getting smarter. This has less to do with genetics and more to do with a history of healthy study habits.

Generation

In the lingo of learning, to "generate" is to come up with your own answer. It doesn't matter whether your answer is right or wrong. What matters is that you do it on your own. You give it your best shot. For example: Cheetahs are built to run, fish are built to swim, humans are built to _____.

A simple fill in the blank can go a long way. Look carefully at what you need to do to come up with an answer on your own. Now contrast that to what it would be like if the answer were simply given to you. The difference is substantial. To be sure, the best instructors are not the ones who provide the best answers. Rather, they're the ones who provide the best questions.

As you generate the answer yourself, you are making it personal. Suddenly the answer matters more. If the answer is given right away, then it's cheap. In many ways, your mind (and ego) places less value upon it.

Of course, it's important that the answer you come up with is confirmed or corrected. But it's equally important that you become personally involved in that answer. Again, we don't soak up information like a sponge soaks up water. Rather we actually build information into our minds. Learning specialists call this "constructivist theory", which tells us that no one can put information into your head but you.

Think of this the next time your instructor requires that you complete a problem set *before* coming to class, even though she has yet to teach you how these problems might be solved. Rejoice in that you have an excellent instructor. Difficult, yes. But excellent.

Reflection

To "reflect" is to think deeply and carefully. It's to give serious thought and consideration. It's a good idea to do this with your private life as happens when you keep a diary or journal. But it's also a good idea to incorporate reflection into your study habits. Ideally you write down or verbally express your reflections. But it can also be helpful simply to pause briefly in your study to ask yourself: What did I just learn? Was it interesting? Was it boring? Was it confusing? Was it crystal clear? What effect might this new knowledge have on my life, personally and professionally?

Reflection allows for spaced retrieval as was described earlier. You can treat reflection as a welcomed break in your study session. More than a break, however, reflection also helps to put the new information into a meaningful context. As you reflect, you may find yourself exploring the bigger picture. Why are you studying this material? How does it relate to your long-term goals? Might these new ideas even be *influencing* my long-term goals, including my career interests?

From reflection should arise inspiration. That could include inspiration to forge ahead or inspiration to jump ship. Let's be real. There's so much to learn. We can learn much, but a single individual can't learn it all. Where you place your study efforts should be closely related to what you want to do in life. It's important to explore many avenues, especially ones that push your boundaries. But it's just as important to have some control over where you guide your ship. Toward this, reflection is key.

Calibration

The brain is wired to make sense. It will do what it can to make sense, even if that means contorting the truth. For example, airplane pilots are trained to trust their instruments. While flying through an overcast cloud, it might feel like the plane is moving straight, but it might be banking left or right or even flying upside down. The pilot wouldn't know if

not for the reference provided by the instrument panel. Most all pilot caused accidents occur when the pilot resorts to his or her intuitive sense of what's happening over the instrument's cold hard data. So firm can be the belief in intuition that the only logical conclusion is that the gauges on the panel must be broken. Then comes deep trouble.

Similarly, it's all too easy to be fooled into thinking that our understandings are accurate. This gives us a confidence to not check ourselves before moving on. This is how misconceptions can last a lifetime.

All the previously mentioned study habits would be for naught if one's understandings were never "calibrated" to some external reference for accuracy. Fortunately, within any school there are very effective calibration instruments. These are called quizzes and exams. However, if you are taking any quiz or exam for practice, beware of this trap: You look at a question and think, "No problem. Why waste my time answering this? I got it. I'll just move on to the next question." You should have the due diligence to confirm your understandings. Think of it as insurance—just to be sure. In the least, you'll also benefit from the retrieval practice. Your time won't be wasted.

While on the topic of quizzes and exams, take note that these tools are just as useful for learning as they are for assessment of what you have learned. You will notice that most all of the study habits outlined in this article are embodied by any quiz or exam. This is why your instructor may love giving them—both as practice and for "real".

An exam can be brought to the next level of learning by implementing it through what is called a pyramid format. In this format the student takes the same exam three times in a single class period: first as an individual (closed book, 10 pts each question), then with a team (four students per team, 6 pts each question), then with the entire class (2 pts each question). A student's score is the sum of the three phases. After the exam, each student is given an "explanation sheet" where they can defend their wrong answers to potentially collect partial or full credit. Instructors, please look to Conceptual Academy's Handbook of Class Activities for more details.

Summary

This article began by describing the nature of how we humans learn, which can be viewed as a two-step process of input followed by output. Both inputting and outputting information can be challenging. But of the two, outputting what you think you have learned is arguably the more difficult, which explains why it is often neglected by students.

Outputting information helps us to strengthen what we know. Consider the young professor preparing to give the first lecture of his or her career. This professor is being challenged to output information in a way that is both eloquent and effective. The stakes are high, which makes preparing for this first lecture quite the learning experience—for the professor.

Students should be given a similar opportunity to articulate what they think they have learned, right within the classroom, with their peers, under the expert guidance of the course instructor.

For all of us, it's easy to be fooled into thinking that you "got it" when an idea is sitting right there in your short-term memory. But short-term memory is leaky by design and shouldn't be relied upon for durable learning. Effective learning strategies, such as spaced retrieval practice and interleaving, work by connecting the ideas to long-term memory, which has a massive capacity.

Other techniques for effective learning include mnemonics, elaboration, _____, reflection, and calibration (RIMEGReC). What all these practices have in common is they require the active and personal engagement of the mind, which means they require effort. When learning is easy, so is forgetting. How well an idea sticks is a function of the effort you put into working with that idea. To learn well, you must move beyond the model that we absorb information like a sponge absorbs water. You must recognize that effort from no one other than yourself is required to incorporate new knowledge into your mental framework.

The hard news is that learning takes effort. No one is exempt. The exciting news is that with effective learning strategies we each have the potential to grow in our intellectual abilities. Your aptitude is mutable, but only when you find yourself with the will and socioeconomic support to make it happen.

Go to it. We face a growing number of problems—social, economic, medical, scientific, technological, and environmental—impacting us on the local, regional and global scales. Now more than ever, we need a community of strong learners capable of finding solutions. Thank you for your willingness to be part of that community helping us to move toward a healthy and sustainable future. Thank you for sharing this article with others! -JS

Exercises

Use these exercises to help you consolidate the ideas presented in this article

1. Describe out loud or in writing each of the following learning strategies
    a. Spaced retrieval
    b. Interleaving
    g. Mnemonics
    c. Elaboration
    d. Generation
    e. Reflection
    f. Calibration

2. What is wrong with reading a textbook chapter repeatedly until the material finally sinks in?

3. What value is there in forgetting?

4. Assume you play the piano and you need to commit three new pieces to memory for an upcoming recital. Why should you avoid learning one piece cold solid before moving into the next piece?

5. Assume you are a music instructor about to teach a course focused on the classical composers of the 18th and 19th centuries. How might you organize your syllabus?

6. Why might highlighting key sentences within a textbook be a waste of time?

7. Create a list of what motivates people to overcome the effort required to learn. Start your list with: Interest.

8. What benefits might there be to supplementing or replacing the Scholastic Aptitude Test (SAT) with a Scholastic Attitude Test?

9. Why do we learn more effectively from a text in which the font is hazy and difficult to read?

10. What benefit is there to a student studying before class rather than after class?

11. It's one thing to know something as true. It's quite another thing to articulate why it is true. For example, complete this sentence: "Putting off study time to the night before an exam is a bad idea because. . . "

12. Why might most people, yourself included, avoid answering all the above questions?

13. Why might writing out answers to the above questions (or speaking them out loud) be more effective than just imagining what the answers might be?

14. How is the role of an academic instructor similar to that of an athletic coach? How is it dissimilar to an encyclopedia?

15. Write a one or two page summary of this article on "How to Study Effectively".