

MSONGO-SMART

Increasing your Academic Performance Scientifically

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I'm not smart enough...

"I tried all my best to study hard and attended all my classes...I even slept less! But my results don't reflect that. Maybe if I were smart enough I would have gotten better grades. I feel completely useless."

"I wish I were as smart as him/her. He/She is so smart at whatever he/she do."

These are just one of the many things that are said by students who think they can never achieve their academic goals. However, how would you feel if you found out that your brain works exactly the same as these so-called 'smart students'. The only thing that differentiates you from them is the way you study. You can spend hours and hours but if you have bad techniques it's useless. This is the secret of all smart students- their good techniques. And once you know them you can also become one of the smartest students in your class. In this book, we will discuss in detail these techniques and which are scientifically proven to work compared to other known traditional methods.

The Issue Is Not More Time (PARKINSON'S LAW)

For most students, they think that they just need more time to study to be able to learn and remember more content. Due to this ideology, students neglect other important things such as their health. For instance, they sleep fewer hours, neglect their hobbies, miss out on exercise, and worst-case they forget about studying for other subjects. Although, you can still do all of these with the little time you think you have and that will be more than enough. It is not how much time that can help you perform well, it is how you utilize your time that will help you perform well. Within the time you think you have, you can accomplish much more than you think.

According to Parkinson's law "work expands to fill the time available for its completion." When you assign a task any amount of time to be completed, it will be completed within the time provided. Assign the task for two hours and it will be completed in two hours. Give it one week and it will be completed in one week. This mainly occurs due to the psychological effects of when you have limited time. When time is not enough, we feel pressured and forced to complete the task. However, when we have an ample amount of time, we work in the slowest manner and constantly procrastinate. We don't do the task till the end because we know we have more time. Ideally, the results in both cases are nearly the same. A good example of this is when

your teacher would give you a week to complete your assignment but would wait till the day before to start doing it. And now that you may be given limited time to submit the work, you would hastily complete it.

As a student, your studies should be important to you, after all, it will take you places and fulfill your dreams. However, you cannot expect yourself to study all the time with no leisure time for yourself. The easiest solution to this is to just divide the time available for each activity, whereby each has its own amount of time needed to be completed. For example, you would sleep 2300-0600, solve physics questions 2000-2045, and exercise 1800-1830. In the designated time for each activity, make sure to set realistic and achievable goals that can be accomplished in that given time. This way you are not just STUDYING HARD but STUDYING SMART.

$$\text{STUDYING EFFICIENCY} \propto 1/\text{STUDYING TIME}$$

To mathematically represent this idea, studying time is inversely proportional to studying efficiency. If you use advanced techniques in studying, your studying efficiency would be higher and hence your studying time would be lower. Take Parkinson's law as a means of making studying fun. Challenge yourself to finish every task in a set amount of time whilst managing to do all the things you need and love. **REMEMBER DON'T NEGLECT ANYTHING THAT IS IMPORTANT FOR YOU.**

Key ingredients:

EAT, SLEEP, AND EXERCISE

Doctors tell us that exercising, sleeping for 7-8 hours, and having a balanced diet are vital for our health. Those who don't observe these are found to have a weak immune system and are more likely to fall sick. It has also been statistically observed that having a healthy lifestyle will simultaneously improve your performance at school and at work.

Having a balanced diet consisting of all nutrients is very essential when it comes to learning. This is because food provides nutrients that are essential for cognitive brain function that allow you to process, store, and receive information. Up to 20% of glucose from your diet is consumed by your brain making it the highest consumer of glucose in the body. And your brain is not only active when you are awake but even whilst you are asleep.

Your brain is made of different parts whereby each part is responsible for a certain function. Whilst you are asleep, new information is transferred from the hippocampus, the part in your brain responsible for storing short term memories, to the cortex for long term memory storage. Memories of the day before are replayed as signals which strengthen the new memory so as to continue to exist for a long time increasing the retention of new materials. Using this to your advantage, you can train your brain to store more information with simple techniques such as revising before going to bed.

Understanding how your brain works is a set forward to working smarter than harder. Your DNA consists of a gene that codes for a brain-derived neurotrophic factor BDNF that is responsible for producing a protein that is responsible for the survival of neurons.

Neurons are receptor cells responsible for transmitting messages throughout the body. According to McGovern, exercise alleviates the levels of BDNF which acts to generate new neurons and repair damaged neurons forming a denser network of dendrite connections which is better able to store and process more information. Put this in mind that when exercising you are allowing your brain to grow, training it to have a large memory. But don't overexert yourself. It is recommended that you exercise an average of 120 minutes every week.

The Smaller The Bite The Sweeter It Is. Savor It!!

Assume you are required to memorize the following numbers 7352797586. Looking at it, it is obvious that you will find it hard to remember such a large number and you will use more energy only to forget it with time. Now, what if there were ways for you to memorize this? Grouping the large number to 73-52-79-75-86 makes it much easier to remember the whole group. Let us use another example, you want to learn how to fly a plane, would you be taught the entire process in one day or over a period of time.

You might be thinking that 'learning how to fly in one day is impossible' but you will learn how to fly a plane step by step each day. Studies have found that our working memory has the ability to process up to 4 chunks of information at once. However, our brains get tired as well because of cognitive overload which may result in forgetfulness. When we are learning more than we can, we begin to feel overwhelmed, insecure when performing that task, and things can seem harder than they actually are.

The studying technique that is discussed here is called *chunking*. It involves the division of the task at hand into small segments that we can accomplish with ease. The segments are called *chunks*. For instance, studying the whole organic chemistry chapter at once is difficult and impossible but if you divide it into portions that you can realistically achieve, then you can finish the whole chapter much efficiently and be confident.

The following are the steps when using this technique;

1. Get the overall picture of the thing you are going to study. It is found that when studying without knowing the directions brings about confusion and decreases your understanding.
2. Divide the task into chunks which can be accomplished without you feeling overwhelmed. The chunks should flow in a logical and chronological order.
3. Begin to study each chunk and understand it well before moving to another chunk.
4. The next time you find something that seems difficult and you feel like you cannot do it or it just scares you solely due to its size, just divide it into chunks you think you can successfully cover with time. Remember SMALL IS SWEET.

You Want To Know The Secret?

The Nobel prize is one of the most prestigious academic awards in the world. Many hardworking people who have greatly contributed to the world are given this award from scientists to authors up to politicians. Dr Eric Kandel, one of many, won his Nobel Prize in the year 2000 due to his contribution as to what happens to the brain when we learn something new. From his research and continuous research in behavioral sciences and neurology, we have come to the understanding that when we learn something new, there are new neurons and connections (synapses) formed, and *the more we practice and revise the same information*, the stronger the connection gets and it becomes easier for our brain to transmit these experiences efficiently and store them for read access later. When a revision is not done, the material learnt is lost with time as the connection weakens. This is how information fails to be transferred from a short term memory to a long term memory. Similarly, when we are sleeping, our brains replay signals of the new things learned which occurred during the day so as to strengthen the new connections.

So the *secret* to academic success is practice and revision. Do the thing you have learned as many times as you can so as to strengthen your memory. This is the basis of the method known as ACTIVE RECALL METHOD OF LEARNING. This method involves recalling what you have learned. This can be accomplished via many methods as long as you are able to remember the things you have learned on your own without referring to the notes or books. Few strategies of the active recall method include; teaching what you have learned, solving practice questions/tests, discussing amongst your peers, using flashcards, or making summaries. The afore mentioned methods have been observed to show a greater percentage of success as presented in the learning pyramid.



The methods with the higher success rates are the ones that use the active recall method.

The active recall method has its own challenges, which may make one think it is ineffective, these include;

1. The struggle to recall information can be considered very difficult and impossible in the beginning and may take time to master.
2. Insecurity increases as you may doubt that you do not recall any of the information which forces you to reread material.

Try to embrace these challenges because the results you will see them as time goes.

Can You be Like A Five Year Old?

(THE FEYNMAN TECHNIQUE)

What is learning? What happens when you have learned something new? and What will you be able to do with it? When one says that they have learned and understood something it means that they know the topic in and out. Albert Einstein once said “If you can’t explain it simply, you don’t understand it well enough.” We all know $2+2=4$ without second guessing, similarly, you must understand what you are studying to be able to explain it without difficulty.

This is called Feynman technique. A technique used by Richard Feynmann, one of the most notable physicists in the world. He was nicknamed as the great explainer as he was able to explain complex physics concepts well enough even a person who didn’t major in physics would understand. The steps involved in using this technique are as follows;

1. Know the part you NEED to study.
2. Note down what you already know about the part and what you need to know.
3. Research what you need to know and make connections with what you already know.
4. Summarize in the simplest form as if you are explaining it to a five years old kid and note down any parts that you think you face some difficulties when explaining. Ask yourself questions a layman (inexperienced person) will ask.
5. Go back to your sources to understand more and repeat the process until you fully understand the concept and you are able to change your jargon and explain without stacking.

ART OF MNEMONICS

In studying there are two things which we are supposed to recall; facts and concepts.

Concepts are easy to recall because you can use your own words and still come to the same conclusion. However, facts require you to state it word by word, in short you are expected to memorize it whole. The best way to memorize facts is through the use of **mnemonics**. This is whereby the information is given another identity using a system of words or letters which helps in remembering the fact. There are three kinds of mnemonics which are commonly used when learning; *Musical Mnemonics*, *Word Mnemonics*, and *Visual Mnemonics*.

Musical mnemonics is when what you want to remember is structured into a song and through the rhythm and the beats it will become easier to recall the information. An example includes the ABC nursery rhyme. Words mnemonics, otherwise known as acronyms, use the first letters of the words required to be remembered and form a new shorter word which can be easily remembered and help to remember the original words. For example, NOF for Nitrogen, Oxygen and Fluorine, which are elements that are able to form hydrogen bonds. Visual mnemonics is the association of something with a vivid or crazy image.

From all three, visual mnemonics are found to be more effective in memorizing facts. One visual mnemonic is the *method of loci*. The method is used by memory athletes and it is found to be extremely effective. Reasons as to why method of loci and other visual mnemonics works are as follows;

1. ***The brain is very good at recognizing.*** It knows quickly the connection between things or what is implied by using a few clues. For example, when you remember someone's face but forgot their name. Scientists say that the brain is made for using information and not storing them. This is why re-reading have being found less effective because most of the time we are recognizing and making connections between concepts which is easier than remembering them.
2. ***The brain is very good at retaining information in visual form.*** As learners we respond quicker to visual information than text.
3. ***The brain remembers information well when it's attached with emotions.*** This is why it's easier to remember your graduation ceremony than what came in your previous exam.

4. *We are able to remember easily when we associate things with locations.* This is especially the case when it is a location we are most familiar with. For instance, you know exactly where all your things are in your room.

The method of loci, although developed 2500 years ago, we still use it today even in our daily lives. When trying to remember/ memorize visually, just imagine the journey/story in your mind in which the things you are required to remember are located in specific locations doing unusual/fun/crazy things. You will find that you will be able to recognize what you were required to remember more easily as the brain is very good at these conditions. By using such methods, less time will be used for cramming facts.

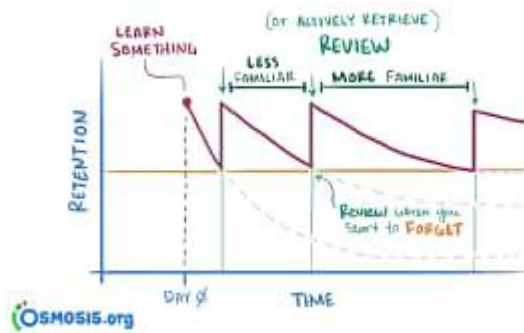
Catch It Before It Falls

It is common for students to revise for as long as they can to remember what they have learned to get good grades. And we all know how disappointed we feel when we forget the smallest detail. But did you know that you can reduce the number of times you revise and still retain more knowledge? Studies have found that the brain slowly starts to forget the information it has retained if it does not revise the information again. This means that we tend to forget as times go. This curve is what is commonly known as the forgetting curve as seen below.



According to the graph, the percentage of information retained gradually decreases over time (in days) as observed by an exponentially decaying curve.

But the good thing is that when we do revision of the thing we have learned at the time we are about to forget it there is increase of our retention capability making it easier to recall the next time. This is further explained in the graph below.



Looking at the graph, when we learn something new, if we do not revise it we will forget it over time. However, Spaced revising reinforces the memory in which you will be able to recall easily than when you have only learned it once. The more revisions, the flatter the curve gets, and more of the material is now retained. On this basis, this technique is known as the **learning spaced repetition** in which there is an increased time interval between each revision for the thing learned.

A recommended pattern is as follows;

1st repetition after 1 day

2nd repetition after 2 days

3rd repetition after 7 days

4th repetition after 16 days

5th repetition after 35 days.

These intervals are perfectly set to remind your brain and make your short term memories into long term memories. The simpler alternative to this is that prioritize doing revisions for things you have start to forgotten more than those which you are more familiar with. Through this method you are able to save more time for other activities.

You Are Detective

When you are able to comprehend what is being taught in your classroom, it will be easy for you to remember when you are studying on your own and saving up more time. So you must be attentive in class so as to make sure you understand the content and the best way to do that is to envision yourself as a detective investigating a case.

First the detective must find their *initial clues* about the case by *paying close attention* to the surroundings when investigating. They need to *note down* everything important that will help in solving the case. And a *good detective* should be able to *combine* what they know about the case and what they found out so as to get a clear picture of the case. They are required to *ask more questions* to their witnesses and suspects to get more evidence. It is also necessary for them to *answer questions* from superiors and come up with *conclusions*.

Initial clues- You need to come prepared to class having done your supplementary reading prior to the class. This is important as you will move along with the teacher and have a larger scope of the topic the teacher is teaching.

Pay close attention- You need to capture what the teacher is saying by listening attentively.

Note down- Write down all important things that your teacher must have said and what you found helpful. Many times, teachers may give out exam tips and hacks that you would have otherwise missed out or forgotten.

combine- Make summaries of everything you have read and what you have gained in class. Have them arranged in a logical and understandable way. This is more of a mental process whereby connections are made intuitively. This will make you more of an active learner.

Ask questions- To be an active learner you start by asking and answering questions. For any part that you didn't understand, ASK. It is very important that you understand.

Answer questions- To be an active learner you start by asking and answering questions. You are more likely to remember what you contributed in class compared to when you don't.

Conclusions- review and summarize whatever you learned in class.

Just remember that the more of an active learner you become, the better learner you become.

LASER EYE FOCUS

When you are running a race against the best athletes in your class, would you be thinking about how to defeat them and win the game, or what you will have for lunch? the question really stands to ask *what are your goals?* Similarly, when studying you should have a laser eye focus on your set goals without being distracted this will enable you to have more understanding and within a very short amount of time.

In order to avoid being distracted and keep our focus while studying we must do the following thing;

REMOVE ANY KINDS OF DISTRACTIONS: Anything that disrupts you from achieving your goal is a distraction. A distraction can either be your own thoughts or an external noise coming from your surrounding environments. Remove whatever distraction you can to the best of your abilities, and for the ones that you cannot, you need to be mentally strong, constantly reminding yourself about your goal. Studies have found that the more you pay attention to distractions the more you will lose your ability to resist them but when you acknowledge them and ignore them your ability to stay focused on one thing will be increased.

There are people say that they can do both studying while doing other things like talking with friends or checking their phones. But studies have found that this decreases efficiency in what you are doing. When you are shifting from one task to another it become difficult to refocus again to that task you have shifted to, this is because in your background mind you are still thinking about the other task, this is known as attention residue. The impact of this you will find that you are using more time for something which you can use less time if you decide to focus. Do the work now there is always time for other things you like.

The following are ways through which you can increase your focus when studying;

1. **Work-rest-work-rest.** Our brain works in an alternating pattern of work and rest. As mentioned in the previous chapters, your brain can become overwhelmed and then your retention ability decreases. This is why when studying, you get distracted quickly. It is best to take small breaks during your studying sessions so as to boost your focus. A great technique is the Pomodoro

technique, in which you study for 25 minutes and rest for 5 minutes. The other thing which can be done is to take a longer breaker after studying.

2. ***Capture yourself distracted and remind yourself.*** Our brain can process four things at once as mentioned before. This is why our minds tend to wander in the abyss, especially when we are studying and this becomes another form of distraction. To avoid this, everytime you wander away remind yourself what you are doing, and if it is another task like your homework that you begin thinking about, jot it down on a piece of paper and commit to attending to it, however, once you are done with your current task. This will help you to concentrate and direct your thoughts in the right direction.

3. ***Stay healthy and fit.*** Studies have shown that having a proper and balanced diet, exercising regularly and having enough sleep, helps in increasing your focus and retaining more knowledge (correlation explained in the previous chapters).

4. ***Avoid stress and anxiety.*** When something is bothering, you are more likely to lose concentration in any task that requires it. To avoid this you have to make sure you have a healthy lifestyle to be mentally healthy. You need to make sure you are not missing out on life. LIFE IS WHAT HAPPENS WHEN YOU ARE BUSY MAKING DECISIONS.

Make Yourself Do It...

You know you are supposed to do something but you don't do it, it is not that there is a great hindrance, it just that you don't feel like doing it. This is known as ***procrastination*** one of the greatest problems to most students. To avoid procrastinating, you require a strong will and discipline. Not only will it make you a better learner and more time-managed, it will make your work reflect your knowledge and dedication.

Based on temporal motivation theory there are four triggers of procrastination, so in order to avoid procrastination you must control them. These triggers can be explained well by using four sets of common excuses used by students when procrastinating;

1. "I will do it tomorrow."
"I still have three days to do it."

“It's due next week, I have plenty of time to do it.”

These are some of the few excuses which come to your mind *when you have more time* until you are required to complete the work. And when you don't have many days left up to the deadline, you begin to panic and your stress level rises.

You can avoid procrastinating and manage your time using the following recommended ways below;

Divide your task into parts you can do daily and dedicate how much time you will use to complete it. Remember slow and steady wins the race.

Set your own deadlines and stick to it. Pressure yourself to complete these tasks on time, which in turn will discipline you and make you manage your time.

Be committed. Stick to your deadlines and daily tasks, reward yourself when you complete a task and be motivated to complete it on time.

2. “I don't have the resources to do this”
 “I cant finish this on time so whats the point”
 “I am waiting for the right time to do this let me solve this other thing first”

These excuses comes when you are trying to **escape studying something** which you find it hard doing and you feel like you don't have the capacity to do It. This can be solved by doing the following

Divide the task into small chunks, dividing into chunks increases the confidence to do it. When you do this it is easy compared to when you try to do the whole task at once

Ask for help. When something is hard and it is intimidating you instead of struggling on your own try to find help from your teacher or fellow student so ask they can help you to understand it more.

3. “It's not that important it can wait”
 “There is still time to do this”
 “I simply don't have enough time to work on it”
 “Once i finish this project i will start working on it”
 “it's not important enough”

These are some of the excuses when the task **has less value to you** or not enough rewards. when something is very important to you, you will not hesitate to do it at once because you know your future depends on it but in your curriculum you are

supposed to study every subject even if it is not interesting to you .To avoid this the following can be done

Reward yourself for the completion of the task. Put a reward as a way to motivate you to complete the task. The reward can be anything from food to clothes, whatever you would like.

Try to change your studying experience. For things you find less interesting to study, just change the way you study so you can enjoy a new studying experience and retain more of the knowledge long-term. You can watch videos, read books, draw pictures, discuss with peers, etc.

4. “let me talk with John first”
“let me look at this new videos first then i will go to study”

These are some of the excuses you give when you don't have **ability to resist distractions**. You find yourself unable to resist them when trying to study and it is not like you don't want to study . The more you are drawn to them the more you lose the ability to resist. To increase your ability you need to resist distractions at all cost when you are studying.

So the main things which you are required to deal with to avoid procrastination are;

1. Inability to resist distractions
2. Considering other subjects have less value
3. Tendency to escape studying hard parts
4. The thoughts of having more time

I AM SMART

Nobody is gifted with academic abilities. Everyone works hard to achieve whatever it is they want to achieve. They dedicate their time, blood and sweat, and social life to get to their goal. *Nobody* is born smart. You become smart once you grow and begin to learn about the world you live in. Remember to *trust your process* and keep on moving.

“Everyone has inside of them a piece of good news. The good news is that you don’t know how great you can be, how much love you can give, what you can accomplish and what your potential is.”

-Anne Frank-

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