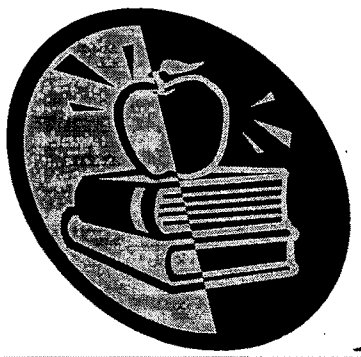

MODULE 5

INFORMATION RETENTION SKILL

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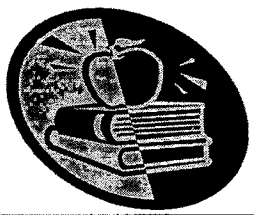


5 INFORMATION RETENTION SKILL

5.1 LEARNING OBJECTIVES

As you learn through this module, you will be able to:

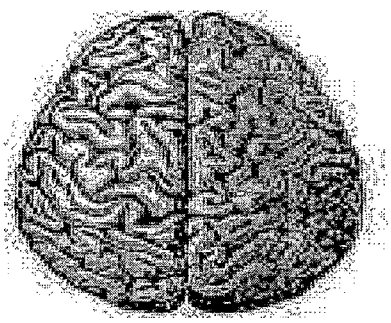
- Understand the structure of the human brain
- Learn about the specializations of the left brain and right brain
- Know about certain nutrients which nurture and stimulate brain function
- Understand the importance of exercise for improving the efficiency of brain
- Learn some techniques for improving your memory while you learn
- Learn the technique of systematic revision
- Use the principle of chunking to enhance your information retention skill

5.2 INTRODUCTION

Learning and retention are different. Learning involves the brain, the nervous system, and the environment, and the process by which their interplay acquires information and skills. Sometimes, we need information for just a short period of time, like the telephone number for a pizza delivery, and then the information decays in just a few seconds. Thus, learning does not always involve long-term retention. Retention refers to the process whereby long-term memory preserves a learning in such a way that it can locate, identify, and retrieve it accurately in the future. The following chapter will throw some light on techniques to improve information retention. Further, in this chapter you will learn about some interesting facts about the new research in the science of brain. Scientists have learnt more about brain/mind in the last 25 years than in the whole history of humanity. According to them, most people use less than 10% of their brain. More than 90% of each person's brain is apparently unused. This chapter will show you some surprisingly easy ways to increase the capacity of your brain using various techniques which will directly or indirectly improve memory, concentration and intelligence.

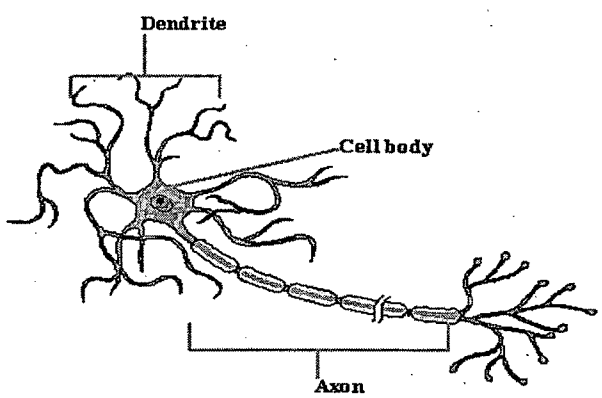
5.3 THE STRUCTURE OF THE HUMAN BRAIN

It is important to understand the physical or biological brain since it gives us an insight into its working and thus means to improve them. The human brain has two parts : a left part and a right part. These two parts are connected by a *corpus callosum* (millions of brain fibers). The convoluted outer surface of the brain is called cerebral cortex. This is so much convoluted in human beings only and it is the basis of human intelligence.



Human Brain

The brain cells are called neurons. An average brain contains 1500 crore neurons.



Neuron or Brain cell

A neuron has a centre called nucleus and branches called dendrites. Each neuron is connected with many other neurons. Current scientific knowledge is that these connections are the basis for all learning and memory. Some scientists have calculated that the total possible connections among neurons are more than the total number of atoms in the whole universe!

(5-3) **TEST YOURSELF**

Q.1. The process which involves the interplay between the brain, the nervous system and the environment and which results into acquisition of information and skills is known as _____.

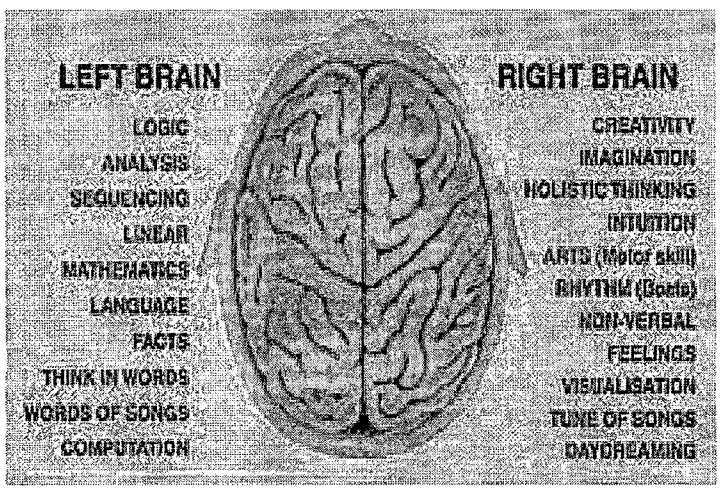
Q.2. _____ refers to the process whereby long-term memory preserves a learning in such a way that it can locate, identify, and retrieve it accurately in the future.

Q.3. A neuron has a centre called _____ and branches called _____.

5.4 THE LEFT BRAIN AND THE RIGHT BRAIN

In the 1960's a scientist named Roger Sperry discovered that the brain can be split into two parts – left brain and right brain and that the two parts perform different functions. The left brain is the logical part. It specializes in the 'academic' aspects of learning. It is responsible for (a) logic, (b) math, (c) language, (d) linear thinking, and (e) rational thinking. It is methodical and tends to think in step-by-step logical fashion.

The right brain is the creative part. It is responsible for (a) creativity, (b) intuition, (c) music, (d) imagination, (e) lateral thinking, and (f) artistic sense. It thinks in images and colours and it can remember complex pictures and songs. It thinks in intuitive way rather than logical way.



The Left and Right hemisphere of the human brain

These two half brains do not work like separate departments but in an interconnected and collaborating way. The right brain and left brain exchange information through

the *corpus callosum.* The left brain controls the right part of the body and the right brain controls the left part of the body.

Children use both the left brain and the right brain. As a result of the emphasis on left brain activities in our schools, our ability to use the right brain is reduced.

This module will help you use both parts of your brains and thus improve your brain power. But before that let us try to understand some basic necessisities for memory improvement.

5.5 NUTRITION AND MEMORY IMPROVEMENT

You probably know already that a diet based on fruits, vegetables, whole grains, and "healthy" fats will provide lots of health benefits, but such a diet can also improve memory. Research indicates that certain nutrients nurture and stimulate brain function.

- **B vitamins, especially B6, B12, and folic acid.** (Best sources: spinach and other dark leafy greens, broccoli, asparagus, strawberries, melons, black beans and other legumes, citrus fruits, soybeans.)
- **Antioxidants like vitamins C and E, and beta carotene** improve the flow of oxygen through the body and brain. (Best sources: blueberries and other berries, sweet potatoes, red tomatoes, spinach, broccoli, green tea, nuts and seeds, citrus fruits, liver.)
- **Omega-3 fatty acids** are concentrated in the brain and are associated with cognitive function. (Best sources: cold-water fish such as salmon, herring, tuna, halibut, and mackerel; walnuts and walnut oil; flaxseed and flaxseed oil). Because older adults are more prone to B12 and folic acid deficiencies, a supplement may be a good idea for seniors. An omega-3 supplement (at any age) if you don't like eating fish. But nutrients work best when they're consumed in foods.

5.6 EXERCISE AND MEMORY IMPROVEMENT

Doing regular physical exercise based on your age, health and physical abilities is important to your mental functioning. Exercise brings more oxygen to the brain through improved blood circulation. This additional oxygen improves the functioning of your brain. Daily physical activities like walking, jogging, running, cycling and swimming not only help in weight control but also improve the capacity of your brain. Two important things to remember is that you should be regular in

your exercise and not to over exert yourself. Another important way of increasing the amount of oxygen to your brain is to do deep breathing exercises like pranayam.

(5-4) TEST YOURSELF

Q.1. The scientist who discovered that the human brain can be divided into two parts was _____,

Q.2. The left brain is the _____ part while the right brain is the _____ part.

Q.3. The nutrients that stimulate and nurture the functions of the brain are _____, _____, _____ and _____.

5.7 TECHNIQUES TO IMPROVE YOUR INFORMATION RETENTION SKILL WHILE LEARNING

Activity

Read the list of words given below quickly. Then cover the list and write the words you remember on the lines to the right in the order that they are presented. Thus, if you cannot remember the eighth word, but remember the ninth one write it on line number nine. Do not worry if you did not remember all the words.

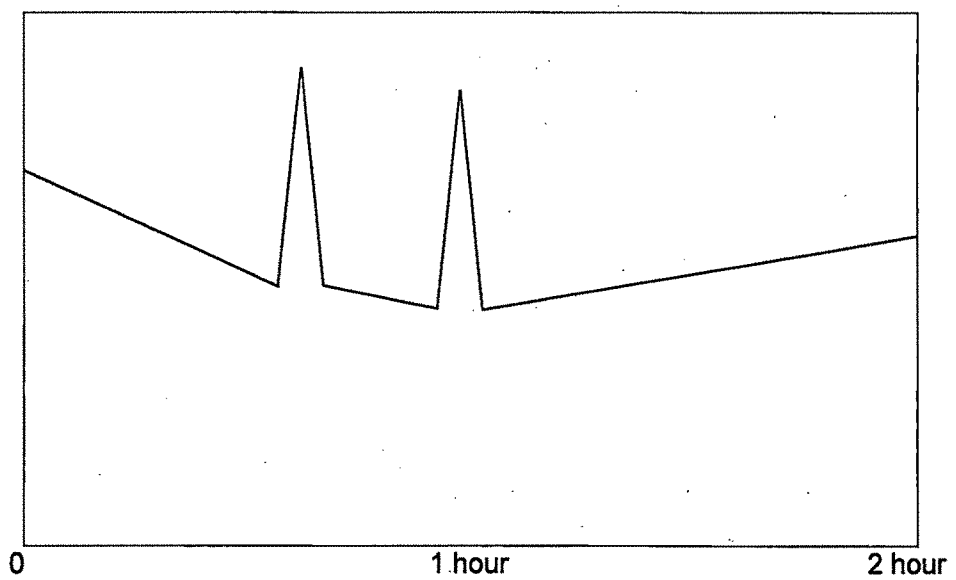
1.	Plum	1. ----------
2.	Hen	2. ----------
3.	Book	3. ----------
4.	Good	4. ----------
5.	Why	5. ----------
6.	Done	6. ----------
7.	Rahul Gandhi	7. ----------
8.	Niece	8. ----------
9.	Well	9. ----------
10.	Buy	10. ----------
11.	Sweet	11. ----------
12.	Sachin Tendulkar	12. ----------
13.	Clock	13. ----------
14.	Good	14. ----------

15. Bell 15. ----------

16. Shop 16. ----------

You must have noticed that you remembered better the words at the beginning and end of the list. Also you must have not missed the two words which are of special interest to you viz. Rahul Gandhi and Sachin Tendulkar.

The following graph depicts memory recall during learning.



Memory recall during learning

From the above activity it is clear that we remember better at the beginning and at the end of a learning period. This implies that we remember less during the middle of a learning period except that there are topics of special interest to us. Thus, in order to maintain our ability to remember high enough, we should take rest in between.

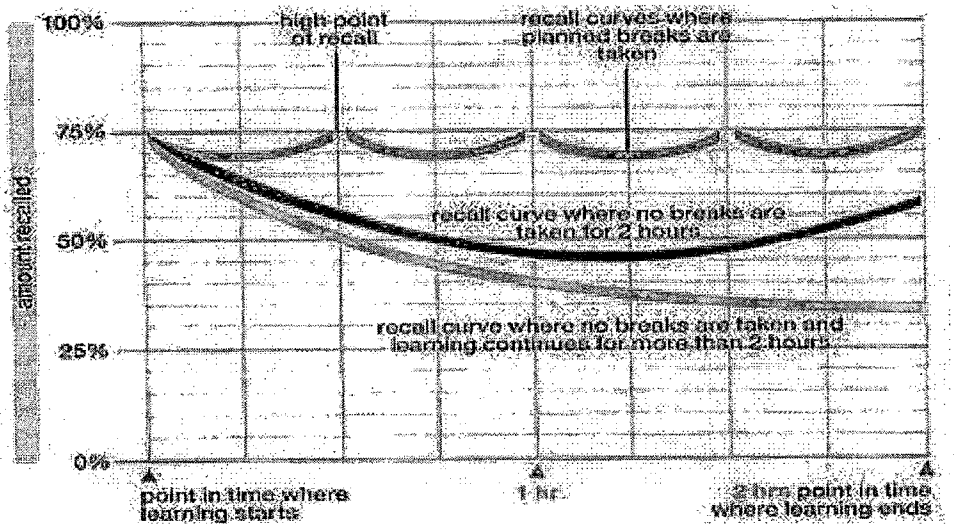
Follow the following tip to improve your information retention skill

Take a break from your studies after 20 to 40 minutes

If you are planning to study for 2 hours at stretch, take a break of about 5 minutes after every half an hour. Thus you have four learning periods each of 30 minutes in a 2 hour session

If you have four learning periods (learning periods of 30 minutes each) in a 2 hour session, then there are four beginnings and four ends which correspond to high learning and high memory. Since there are 4 learning periods, the middle drop will also be smaller than the drop for one 2-hour learning period without any rest.

The following graph depicts that memory improves during learning if frequent breaks are taken in between.



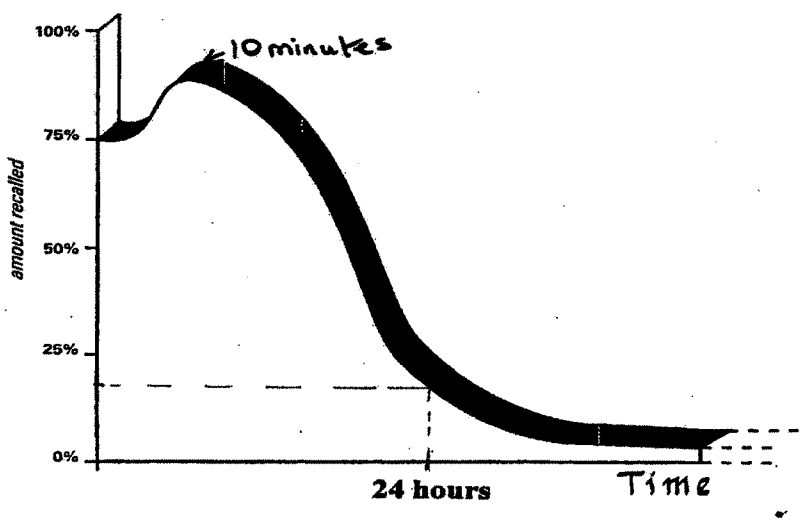
Source: http://www.manal-jz.com/2011/brilliant-memory-by-tony-buzan/

Next let us see how our information retention skill (memory) changes after hours and days of learning a content and how we can use this knowledge to improve our learning.

5.8 SYSTEMATIC REVISION TO IMPROVE MEMORY AFTER LEARNING

The following graph is a result of research in psychology. The graph shows how much we remember after learning something.

Memory after a learning period



Source: http://austal.net.au/Accelerated_Learning.htm

The graph begins at 75% because normal learning does not result in 100% memory. The graph shows that we remember better at about 10 minutes after learning finishes. The reason for this strange memory phenomenon is simple: at the moment learning period finishes, the brain has not had enough time to organize and store the last items. It needs a few minutes to store, organize, integrate the last items. Further we can see that memory decreases sharply after initial learning. We remember only 18% after 24 hours. This is very important fact for you to remember. This loss of memory can be prevented by using the technique of systematic revision.

Systematic revision is an extremely powerful scientific technique for transferring information from short-term memory to long-term memory.

According to this technique you should revise shortly after learning period as follows:

Systematic Revision

*about **10 minutes** after learning finishes*

*revise again within **24 hours***

*then after **1 week***

*then after **1 month** and **6 months**.*

The above technique suggests that you revise two times in one day after you learn something new. To make this task easy you may use the following techniques about which you have already learnt in the previous modules.

- Speed reading (module 3)
- Spend only about 5 seconds per page while revising by writing notes in a special style that help memory and quick revision viz. mind maps. (module 4)

(5-5) TEST YOURSELF

Q.1. We remember only ____ % of information after 24 hrs of learning.

Q.2. Dividing a 2 hr learning session into four learning session results in better learning. (True/False).

Q.3. Systematic revision is an extremely powerful scientific technique for transferring information from _____ to _____.

5.9 USING CHUNKING TO ENHANCE RETENTION

Another method by which you can improve your information retention skill is to use the principle of chunking. Chunking is the process whereby the brain perceives several items of information as a single item. Words are common examples of chunks. *Umbrella* is composed of eight letters, but the brain perceives them as one item of information, i.e. one chunk. Nobel-prize winner Herbert Simon (1974) found that we can generally hold 7 ± 2 'chunks' of information in short-term memory. However, the 'chunk' can vary enormously in size: it could be a single word or number, or a phrase, or a whole story, or how to count up to a million.

Activity

Try this out for yourself.

- Read the list under 'small chunks'
- Cover the list, and then try to remember each phrase exactly.

You should be able to remember roughly the same number of chunks, irrespective of their size – for example, five sets of two words and five sets of longer sentences.

Small chunks (2 words)

Happy birthday

No way

Mouth-watering

New Year

Activity

- Read the list under 'bigger chunks'
- Cover the list, then try to remember each phrase exactly.

Bigger chunks (7-10 word sentences)

The rain in Spain falls mainly on the plain.

.....

There is no business like show business.

.....

Once upon a time there were three little pigs.

.....

Postman Pradeep has a very nice hat.

.....

'Chunking' helps long-term memory

The same principle can be used to help organize information in your long-memory. This is especially useful for exam revision. This is a useful tactic to use whenever you have to remember information that does not link up easily.

How to use the technique?

Here are the steps on how to use the principle of chunking:

1. *Write each piece of information you need to remember.*
2. *Arrange them in the order in which you are likely to use them.*
3. *Then make up a story to link them together into one chunk.*
4. *Give the story a simple name.*
5. *The crazier the story, the easier it is to remember.*

Example

String of words to revise

Cow	grass	field
Tennis	net	soda
Dog	lake	fish

Picnic story

We can chunk the sequence of items by using a simple story. First, we see a **cow** eating **grass** in a **field.** Also in the fields are two people playing **tennis.** One player hits the ball way over the **net.** They are drinking **soda** while their **dog** runs after the ball that went into the **lake.** The dog's splashing frightens the **fish.**

Example

You can use chunking to remember the following list of words as follows.

- Eggs
- Syrup
- Cereal
- Blueberries
- Baking powder
- Butter
- Flour
- Milk
- Bacon

Think of these items as three different breakfast lists:

Eggs and **bacon** for day one.

Pancakes for day two, requiring **flour**, **baking powder**, and **milk**. We'll also need **syrup** and **butter**!

Cereal for day three: **cereal**, **milk**, **blueberries** (it doesn't hurt anything to repeat milk).

Activity

1. Now, locate in a textbook or your class notes some information for which chunking is a good remembering strategy. Write the pieces of information to be remembered here.

.....

.....

.....

.....

2. Write a linking story to remember this information.

.....

.....

.....

.....

.....

.....

.....

.....

(5-6) TEST YOURSELF

Q.1. _____ is the process whereby the brain perceives several items of information as a single item.

Q.2. Nobel-prize winner Herbert Simon (1974) found that we can generally hold _____ 'chunks' of information in short-term memory.

5.10 SUMMING UP:

The human brain has two parts : a left part and a right part. These two parts are connected by a *corpus callosum* (millions of brain fibers). The convoluted outer surface of the brain is called cerebral cortex. This is so much convoluted in human beings only and it is the basis of human intelligence. The brain cells are called neurons. An average brain contains 1500 crore neurons. The brain can be split into two parts – left brain and right brain and that the two parts perform different functions. The left brain is the logical part. It specializes in the 'academic' aspects of learning. It is responsible for (a) logic, (b) math, (c) language, (d) linear thinking, and (e) rational thinking. It is methodical and tends to think in step-by-step logical fashion. The right brain is the creative part. It is responsible for (a) creativity, (b) intuition, (c) music, (d) imagination, (e) lateral thinking, and (f) artistic sense. It thinks in images and colours and it can remember complex pictures and songs. It thinks in intuitive way rather than logical way.

Certain nutrients like B vitamins (especially B6, B12), folic acid, Antioxidants (vitamins C and E), beta carotene and Omega-3 fatty acids nurture and stimulate brain function. Doing regular physical exercise based on your age, health and physical abilities is another important means to improve your mental functioning since exercise brings more oxygen to the brain through improved blood circulation.

In order to maintain our ability to remember high enough, we should take rest in between.

Take a break from your studies after every 20 to 40 minutes. Systematic revision is another extremely powerful scientific technique for transferring information from short-term memory to long-term memory. According to this technique you should revise shortly after learning period as follows :about 10 minutes after learning finishes, revise again within 24 hours, then after 1 week and then after 1month and 6months. To make the task of revision easy you may use the technique of speed reading and mind mapping.

Chunking is the process whereby the brain perceives several items of information as a single item. Herbert Simon found that we can generally hold 7 ± 2 'chunks' of information in short-term memory (1974). This principle of chunking can be used to improve your long term memory.

5.11 REFLECTIONS

1. Think about what you have learned in this unit. Write about it here.

2. How will this make you a better student?

3. How will this make you a better teacher ?

ANSWER KEY

5-3.

Ans.1. Learning

Ans.2. Retention

Ans.3. nucleus, dendrites

5-4.

Ans.1. Roger Sperry

Ans.2. logical, creative

Ans.3. vitamin B, vitamin C, vitamin E and Omega-3-fatty acid

5-5

Ans.1. 18%

Ans.2. True.

Ans.3. short term memory to long term memory

5-6.

Ans.1. Chunking

Ans.2. 7 ± 2

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