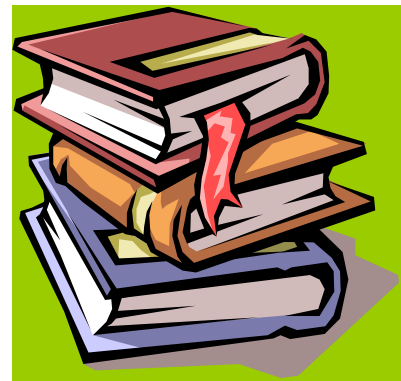




Effective Classroom Learning



A seminar for teachers and trainers in
professional and technical vocational skills
training



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Introduction

“Tell me – and I forget. Show me – and I remember. Let me do it – and I understand.”

This saying of the Chinese philosopher Confuzius is, in a way, the essence of the seminar coming along with this handout: “Effective Classroom Learning” aims to make teachers and trainers aware that achieving high learning results means to get students actively involved throughout the whole learning process.

In order to understand this simple but most effective rule the first part of the training is centered round the function of the brain in the context of learning. The second part of the training translates these findings to day-to-day teaching: How teachers and trainers can assist their students in becoming self-reliant learners, how they can diagnose major learning problems and how they can counsel students with learning difficulties, all of which leads to a new concept of learning.

This handout coming along with the training covers the main inputs given during the seminar. It also provides the background information for the various exercises executed. While the seminar itself is built around different learning experiences for its participants, the handout provides further elaboration on the respective topics for those who want to go deeper into the subject. By itself, this material is intended to create understanding of the numerous factors influencing learning and to raise the awareness for the importance of learning in modern societies.

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Unit 1 Brain Power

1. Learning – general considerations

Learning has gained more and more attention over the past years. Be it policy makers, be it business people, be it teachers or parents, all stress the importance of learning: not only is there far more information available than it used to be, it is also outdated much faster than in previous days, which again leads to changes in the working environment. Hence, continuous lifelong learning has become an indispensable part of our working lives.

But what really is learning? Which factors influence learning? And how can the process of learning be improved? Before we try to answer these questions, let us first agree on what we mean by learning. One of the broadest definitions states that learning means change of behavior due to experiences: Being exposed to new knowledge, experiencing new skills, exploring new attitudes leads to new patterns of behavior. We know more than before, we can do things better than before, we hold a different opinion than before - all of which allows us to behave differently than before.

Through learning we acquire new...

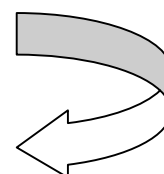
Learning = Change of behavior due to experiences

Knowledge ←

Skills ←

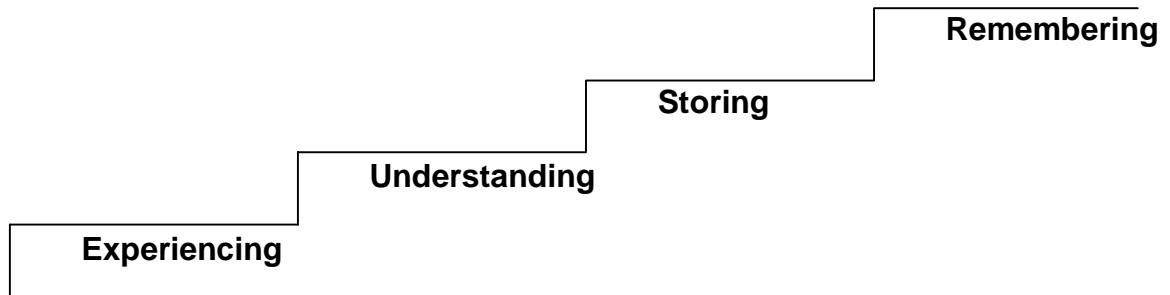
Attitudes ←

New patterns of behavior





However, behaving differently than before requires that we can recall what we have learned previously. Prior to that, it also requires that we really understand what we learn. The learning process therefore involves four major steps: experiencing something new, appreciating and understanding this new experience, storing it in our memory and recalling it later.

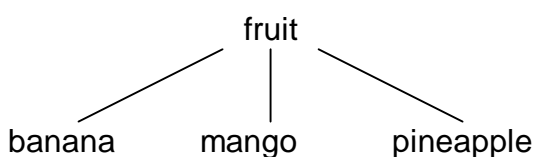
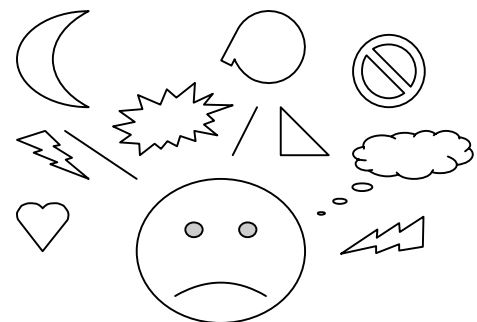


The question now is: How can this process be enhanced? Modern brain research has come up with interesting insights, which help us to find answers to this question.

2. Learning and modern brain research

In order to remember what we have learned new information needs to be stored in our memory in a way that it can be retrieved any time. One of the biggest difficulties within that context is to protect ourselves from learning too much: Since innumerable impressions and perceptions compete with one another for our attention, our memory has to decide what to store. If not, within no time we would just drown in senseless data trash. Therefore, our memory has to perform two major tasks:

At first, it has to distill what it considers worthwhile remembering from all the thoughts, ideas, impressions, experiences and perceptions we are exposed to. So our brain has to differentiate between important and unimportant information.



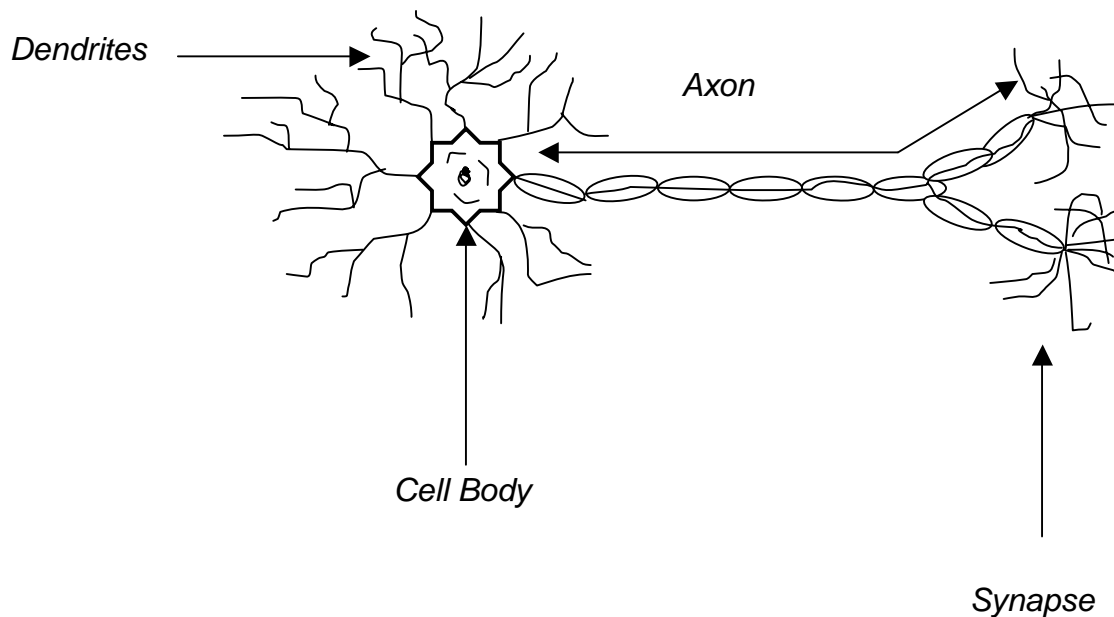
Next, this extract has to be put in a certain order. For this reason we need categories. For example, to remember mango, banana and pineapple, we need the category *fruit*. Categories allow us to link different bits of information among each other and to put them in a systematic order. In return, this also allows us to retrieve stored information more easily.



Modern brain research has identified neurons as the crucial elements in performing these two major tasks: A network of 10 – 15 billion neurons filters and sorts all information that is stored in our memory.

Neurons are the units that make up the human nerve system. They are mainly found in the brain (approximately 10 – 12 billion), the spinal cord, the brain stem (connection between brain and spinal cord) and the whole body in form of threadlike branches. A bundle of neurons are called a nerve.

A neuron consists of the *cell body*, *dendrites* (hair-like extensions of the cell body), the *axon* (an extension of the cell which can have lots of branches), and *synapses* (the point where the axon of one neuron connects with the dendrite of another). The function of neurons is to transmit impulses in form of electrical and chemical changes. The receiving structure of electrical impulses are the dendrites, the transmitting structure are the axons.



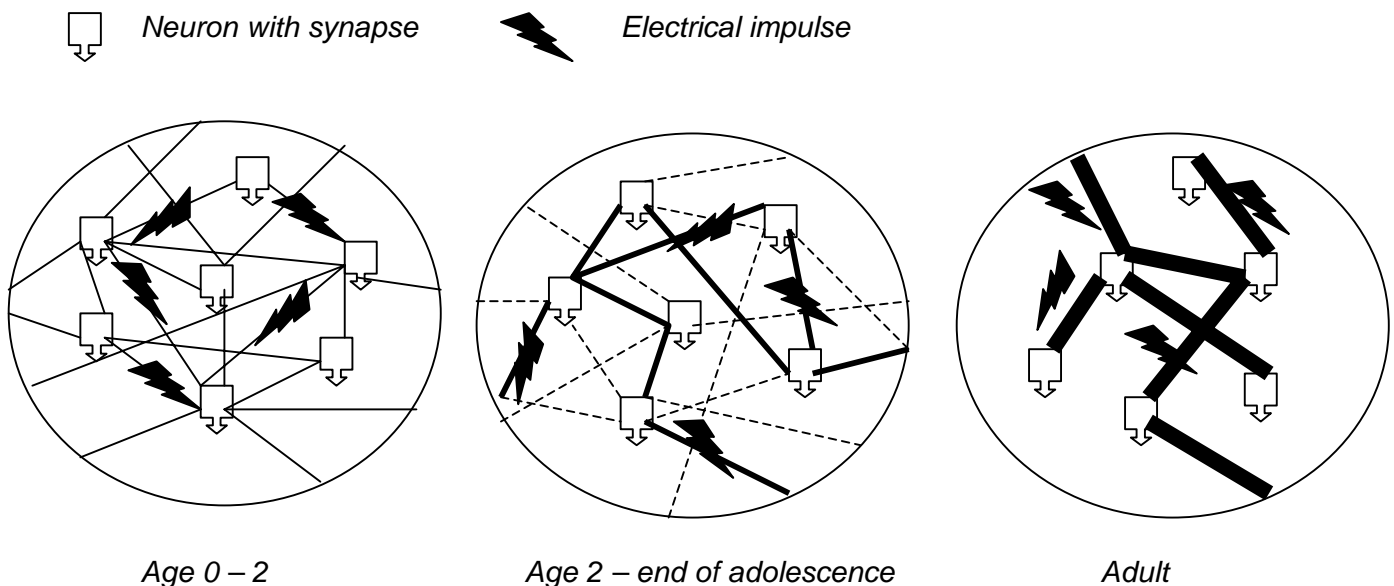
Schematic drawing of a neuron: 20,000 neurons would fit on a pin head.

Repeated transmission of impulses between two cells enhances these activities; pathways are being established. Each stimulus a human being is exposed to changes this neuronal network by strengthening a particular connection and, eventually, weakening another. All learning experiences can be translated into this basic reaction pattern. A closer look at the development of the human brain will reveal further insights.

3. Brain development

When we are born, the major part of our brain is already developed. Its actual growth is finally completed during the following months. With regard to the neuronal net itself, its maturation takes place in two phases: from birth until the age of 2 and from childhood until the end of adolescence.

The neurons of a newly born baby are connected among each other like in an even, densely woven net. This neuronal net passes on impulses in all directions. Until the age of two the number of these connections (synapses) increases.



With the process of learning setting in, connections between particular neurons (synapses) are strengthened since the number of impulses increases. On the other hand, connections rarely used will slowly wither.

After adolescence, learning mainly consists of using the existing connections. During adulthood, hardly any new neuronal connections will be added.

This shaping of the brain is strongly influenced by the environment each individual is exposed to. Particularly during the first two years, sensual impressions like noise, smell, taste have as much influence on the brain's development as the type of food a baby gets, the air it breathes, the people it is relating with. As adults we cannot recall these first experiences, yet they have a strong impact on our whole life. They determine the way we think by establishing perception patterns. These patterns differ from individual to individual, family to family, region to region, country to country, culture to culture.

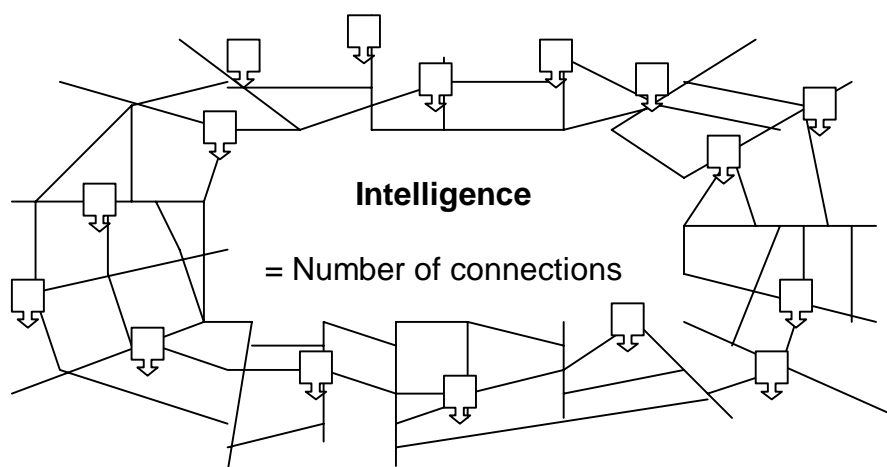


The way the brain is structured is irreversible. It corresponds and is highly compatible with the immediate environment we have been exposed to during our first months of life. Likings and dislikes are being developed, preferences for visual, audio or touch established. For example, an African baby that is being carried around on its mother's back during its first months is likely to develop a high preference for touch. Likewise, the brain of a baby growing up in a very deprived environment or suffering malnourishment will never develop its full potential.

This process can also be expressed in computer language: during the first months the hardware is installed. Correspondingly, at the age of two until the end of adolescence the installation of the software takes place. In a way, the circuit diagram of the neurons is being established. The decision is made which neurons are connected among each other. Thus the structure of thinking of the future adult is basically being determined.

As adults, we almost exclusively rely on this existing neuronal network since hardly any new connections are being established. This also helps to explain why adult learners usually have problems accepting ways of learning they are not familiar with: in a way, they lack the software. This difficulty is also expressed in the saying, "You can't teach an old dog new tricks". On the other hand, the more varied the stimulation during childhood and adolescence, the more complex structures are being formed which, in return, offer more points of reference for future learning.

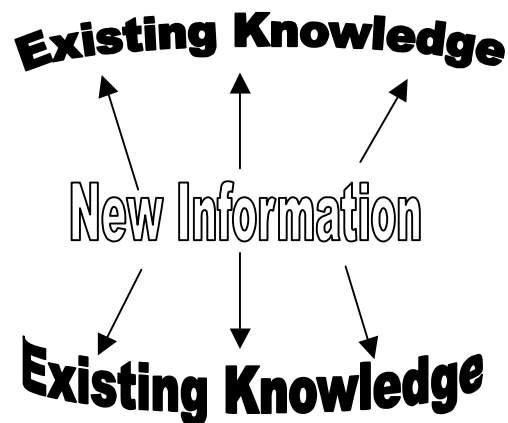
Looking at these findings, we can already draw two major conclusions: First, it is quite obvious that human beings need a stimulating environment right from the start for the optimal development of their brain since intelligence is not so much depending on the number of neurons but on the number of connections. Second, it is also obvious that the numerous individual differences among learners need to be recognized in the learning and teaching process.





4. *Developing the neuronal network*

Learning is a self-stimulating process: the more we know, the easier we learn. The more English a student knows, the easier and faster he/she learns even more English. The secret behind this formula is very simple: whenever we can link new information to already existing information – unknown to known information -, we stand a good chance that our learning efforts will be successful. We stand an even better chance, when we can link new information not only in one but manifold ways – when new information appears in different connections, when we can incorporate it into our existing net of information by linking it to various other points of reference.



The more we know, the more we can perceive. Our knowledge influences everything we perceive, since perception relies on the ability to recognize. What we don't know, we can only perceive very vaguely, if at all. For example, words and letters in a foreign language are only noise and lines without meaning for us. Increasing our knowledge means to enhance our ability to perceive. The best basis for learning – perceiving, understanding, storing and remembering – is a broad network of knowledge.

This also explains the advantage adult learners have over young learners: grown-up people have a much greater professional and life experience which offers far more points of reference for connecting new information.

To support the development of the neuronal network of children and young students, they should be exposed to challenging tasks from early age on. Teaching approaches that lead to sudden insights should be fostered. Instead of providing students with ready-made solutions (spoon feeding), they should be encouraged to come up with their own ideas on how to solve a particular problem (discovery method). The feeling of pleasure that goes along with the successful, independent solving of a task is far more sustainable than any reward from outside. Thus, a positive attitude towards learning is reinforced.



The more students can try on their own and experiment with familiar day-to-day items during the process of learning, the faster they acquire new knowledge. Whenever possible, the learning content should also relate to daily life experience. Not only does it stir the interest of students and motivate them, it once again means applying the very simple but most effective teaching principle: establishing links between known and unknown information.

5. *Recognizing individual differences*

Though there are a lot of common features with regard to the learning process, there are many differences when it comes to the individual learner. Considering the development of the brain, we know that every human being is different. These differences also influence the style of learning of each individual. They depend on a wide variety of factors:

Connecting links & prior knowledge

As we said already, understanding means linking and incorporating new information to and into knowledge already stored. Thus, how quickly we understand something is also dependent on the number of verbal and pictorial connecting links and prior knowledge.

Reference to life

The assimilation of an item of information, attention, interest, motivation for a subject are associated with the question whether we can draw a relationship to our own life, whether we see a sense or use in the subject matter.

Style of learning

Whether we can learn facts better through lecture or group work or through other methods, whether we can learn better by heart or by discovering the solution to a problem ourselves, also depends on the style of learning we have experienced.

Basic patterns of perception

During the first months of our lives, the basic patterns of perception are developed, likings and dislikes for audio, visual, touch etc. are established. They influence our preference for learning by reading, hearing, seeing, feeling or experiencing what is new.

Learning success and good school results do not only depend on the absolute intelligence of a person (the ability to perceive, combine, memorize), but also on the compatibility of learning patterns. As students, we always have a partner – the teacher, a book, other students – and we are learning well when we recognize ourselves in the other, when our pattern is in accordance with the pattern of the partner. Therefore, the same content, regardless of its degree of difficulty, can be learned easily or with great effort. An example taken from a physics class will illustrate this.



The students are asked to learn the law “Pressure equals force divided by area”.

Listening

The first student attempts to assimilate the information by listening. Fundamental principles are explained in the course of discussion and misunderstandings are clarified.

Observing

The second student apprehends the law by observation and experiment. He/she observes how a sharp nail is driven into the wall more quickly than a blunt nail, because there is a minimum contact area of the point of the nail thus increasing the pressure.

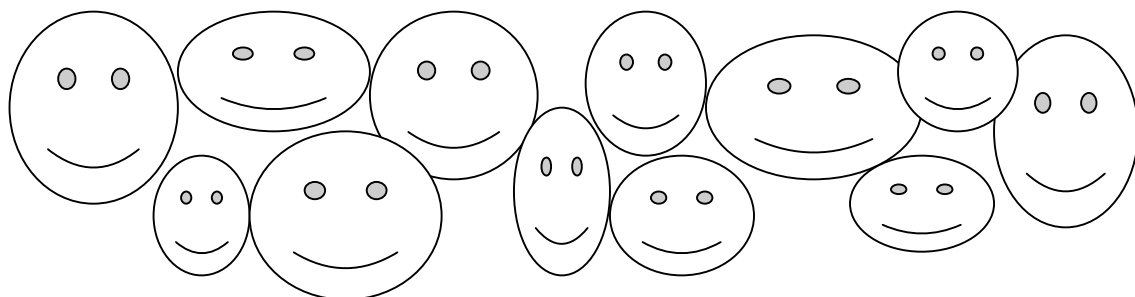
Handling

A third student apprehends the law by means of handling and feeling. He/she takes hold of two pencils. First he/she presses one finger against the flat surface of the pencil, then a finger against the sharp tip of the other pencil. Here, he/she experiences pain, because the point noticeably increases the pressure as a result of its low surface area.

Reading

The fourth student apprehends the law by insight and reasoning; he/she reads about the abstract formula.

Had the subject matter only been explained in writing, the first three trainees would have had considerably more difficulties in learning the law. Today’s teaching still favors mostly one single learner type with a preference for verbal expression and abstract thinking. However, the number of students equals the number of different learner types. While it is obvious that a teacher cannot take account of each individual learner in a class over a long period of time, he/she should still try to give all of them an equal chance for learning. This means recognizing different needs of different students by making the link to the conditions pupils bring with them and by adapting the teaching to the various forms of learning.



Even though we cannot cater for all the different learner types in our daily teaching, at least we should allow the development of these different types, such as the reading loner, the teacher-fixated contributor, the discussion loving talkative type, the curious listener, the competition-driven and the competition-frustrated – just to name a few out of many others.



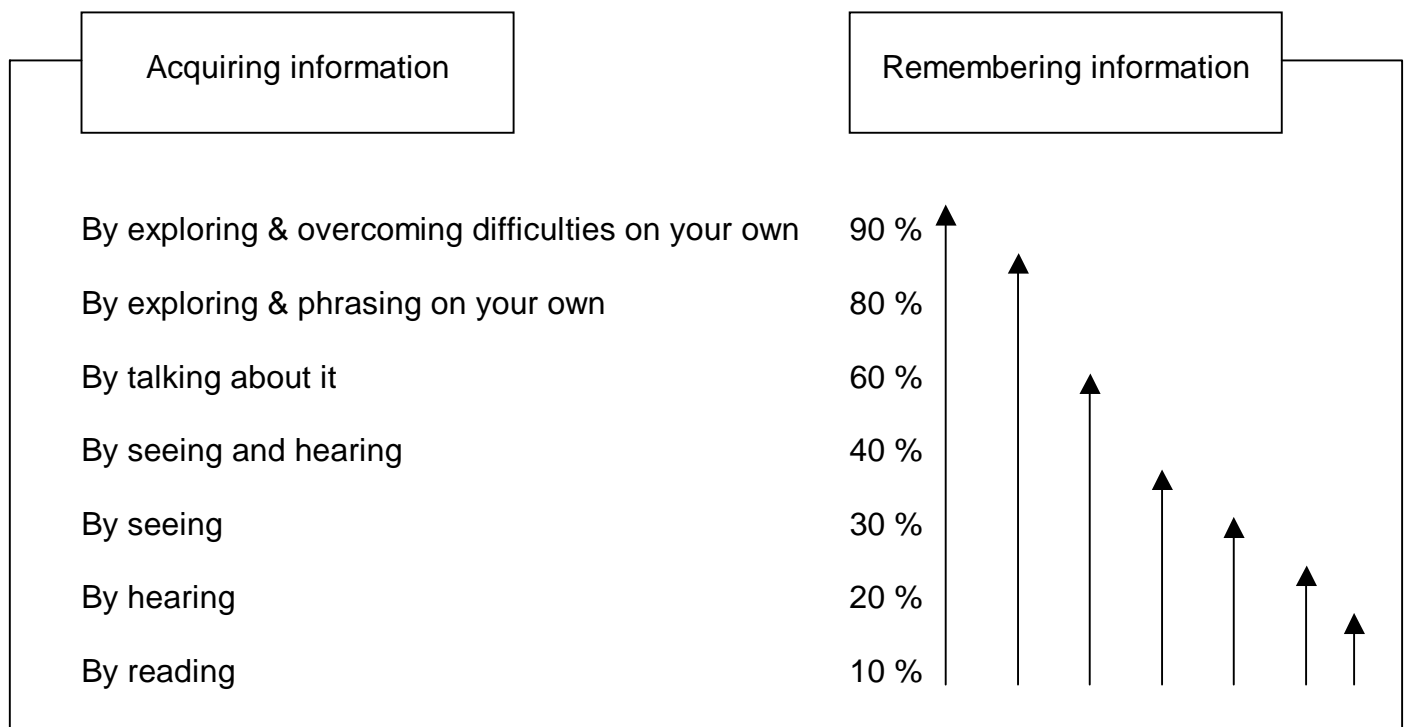
It means to relate individually to the different students and to make use of different teaching methods in order to provide for as many students as possible.

For good learning results, it is also crucial to make students aware that they each favor a certain learning style. Students become more relaxed and can listen better to a lecture even if it is not their learning channel. Knowing how we learn best helps us to compensate for instructions that are not favoring our particular way of learning.

6. Creating multi-channel information

As we know, each learner favors a particular way of learning. This usually includes a preference for a certain input channel, like audio, visual or kinesthetic. The physics class was a good example when the same content – pressure equals force divided by area – was presented in different ways, thus facilitating learning for as many students as possible.

We also know that we remember new information better when it appears in more than just one particular context. To make learning successful, it is important to present new information in different ways using different input channels. The retention span of newly learned information is also related to the way we acquire it: the more senses are involved, the higher the learning result.





A lot of people complain they cannot remember new information or have a hard time learning something new. Usually, they hold their memory responsible for this. Though it is true that the memory is the most crucial factor for successful learning, it is most often not the one to be blamed for low learning results.

What we remember depends to a large extent on the way we prepare new information for storage – how we encode it will influence our ability to decode it later. The quality of our encoding determines the quality of our decoding. The difficulties we have with recalling something is not so much a problem of recalling itself but very often of the previous step: the encoding. To understand this better, let us have a closer look at our memory.

7. The human memory

As we said, learning means change of behavior due to experiences. Memory then equals the impact left by experiences. In other words: there is no proof of learning without any change in the memory. And, vice versa, a change in the memory indicates a learning process.

The role of attention is by no means less important. What we learn depends on our attention. Despite being exposed to numerous impressions and stimuli each day, we only remember a fraction of them: what we learn and remember is to a large extent a function of our attention.

At present we are still unable to completely understand how our memory functions. Therefore we are only looking at a model: It does not represent any physical structures. It is just a concept that helps us to understand the human memory and how it works better. According to this model, the human memory consists of three parts: the sensory memory, the short-term memory and the long-term memory.

The sensory memory is very limited in terms of quantity of information which it can make accessible to us and also in terms of duration: It is a phenomenon that only lasts for seconds. That means a very limited number of stimuli can be remembered or noted within a very short period of time, regardless of whether we pay them any attention or not.

For example, during a cocktail-party we can talk with someone without noting what is being said around us but as soon as our name is being mentioned, we suddenly listen. Or, we walk in the street being deeply in thought when a good friend of us passes by. We continue to walk and only two seconds later we stop and turn around because we have recognized our friend: the sensory memory then is like an echo – bringing back the information to us that we just saw someone we know. The sensory memory represents the fact that we can avail of a stimulus for some time after it occurred.



As short-lived as these stimuli or perceptions may be, they can lead to vital responses. We only have to think of driving a car: a car horn, a pedestrian in the center of the road, a red light. Here, perceptions often trigger off essential reactions, although they only stay in the memory for parts of a second, and then are forgotten.

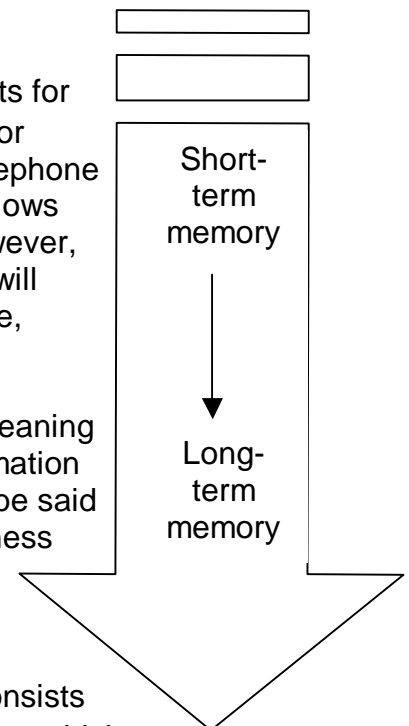
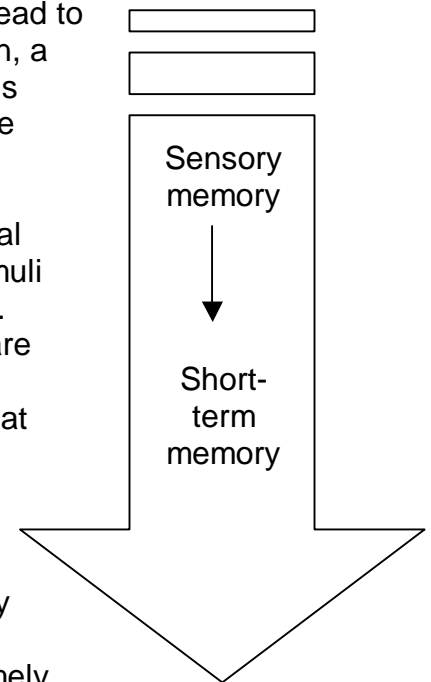
Each day we are exposed to thousands and thousands of sensual impressions through the eye, the ear or the skin. All of these stimuli first enter the sensory memory where they leave a sensory mark. At the next stage they enter our short-term memory where they are associated with words and names. From the fact that we only remember a fraction of all these impressions we can conclude that there must be a filter:

If we are not attentive, these perceptions pass by like noise in the street or like the sound of a foreign language. They are regarded as uninteresting for storage. Thus, the sensory memory has the function of a filter or “door-keeper”: it decides what to let pass and store and what to dismiss and delete. This is an extremely important function, because it protects us against over-loading with information.

The short-term memory is a phenomenon that only lasts for about 20 seconds up to minutes. It can store about 7 items plus or minus 2. It allows us, for example, to look up a number in the telephone directory and dial up this number without looking at it again. It allows us to forget this number immediately after we have dialed it. However, should the line be busy and we have to dial it again, we usually will have to look it up a second time. To remember it for a longer time, we have to repeat it constantly.

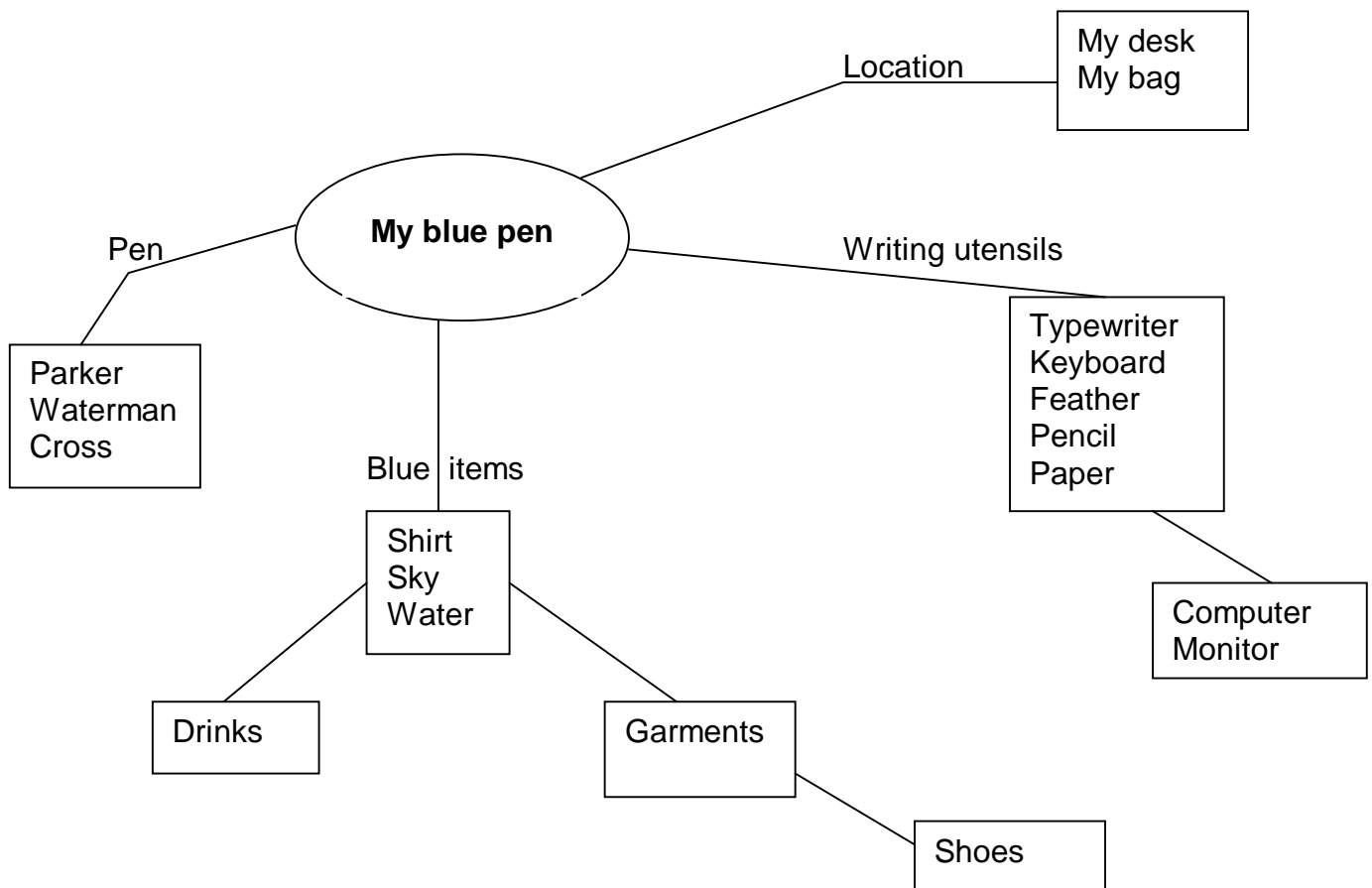
The short-term memory is an active, ongoing process. It gives meaning to the information that is perceived. However, it stores this information only for a short time unless it is being repeated. Basically it can be said that it comprises everything that is within our attention or awareness at a given moment. As such, it can also be called the actual consciousness.

The long-term memory comprises everything else. It consists of encoded, consolidated information out of the short-term memory which then is equated with concepts and meaning. Not only does it store information over a much longer period of time than the short-term memory, it also is much more passive as opposed to the active ongoing process of the short-term memory. It is also much less susceptible to interferences and its capacity is much higher. While it is easy to call upon information in the short-term memory, it can take much longer to retrieve information from the long-term memory.





Previous models thought of the long-term memory as a continuous recording of all our experiences, not unlike a videotape. Recent research has developed different models: they are all of an associative nature. Basically this means that all information is linked with each other and forms knots like in a big web. For example, when we search for a certain item in our memory, we don't just simply produce a long chain of answers and see whether they fit the question or not, we try to limit the area in which the information can be found by linking it with other information. In the example below, "My blue pen" is linked to various other bits of information or knots which themselves are linked to many more knots, which are not displayed in this illustration.



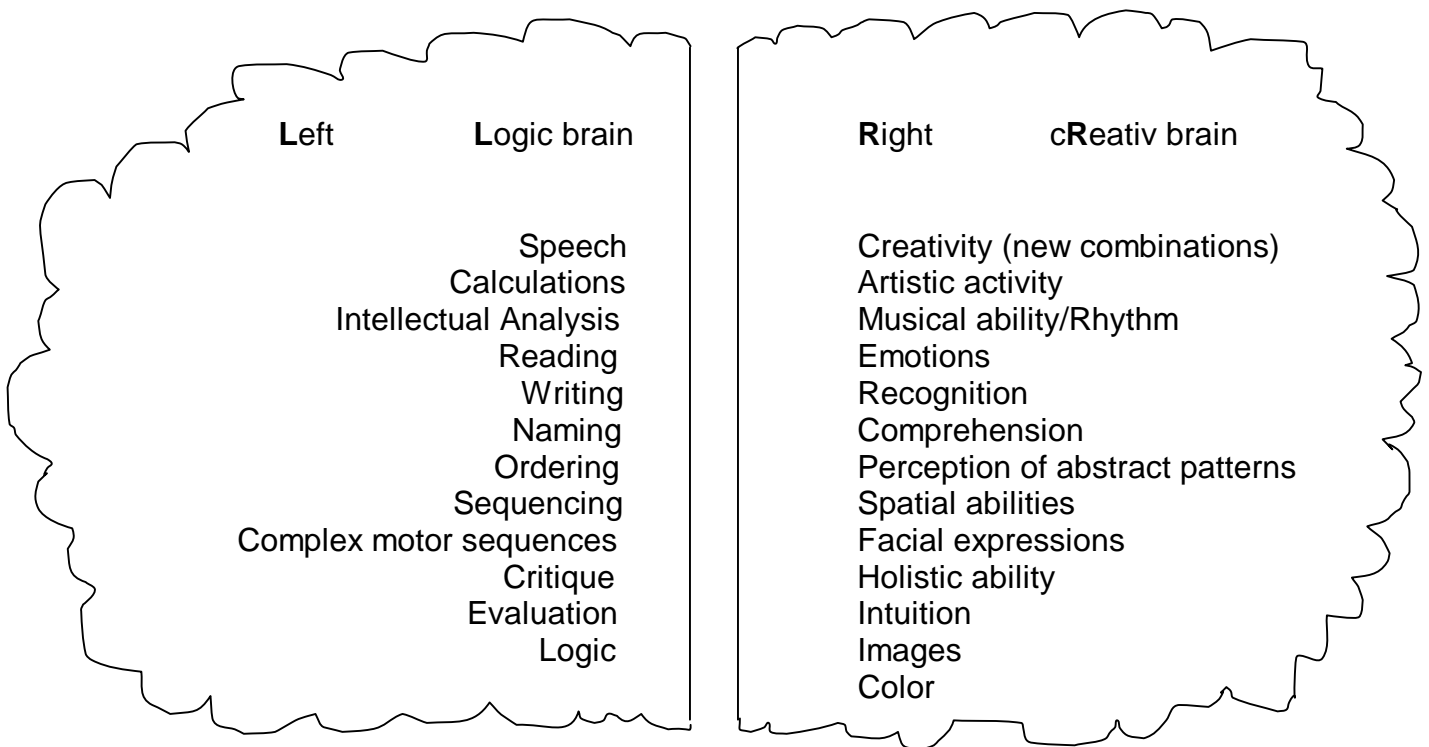
As we already said, we remember new material better when we incorporate it into already existing information: It reflects the way our memory is structured. With regard to learning strategies, memorizing alone is not very helpful. Synapses are only strengthened mechanically, so to speak, without giving this new information any particular meaning. New synapses are mainly being established when new information is being applied. Affections reinforce this process. For example, newly learned English words used when talking to a girl- or boyfriend will migrate much easier to the long-term-memory since there is a link between these words and a strong emotion such as love. Also, remarkable material is remembered much easier and longer than insignificant material as well as outstanding, important or very emotional events: we can recall them more clearly and longer than other events.



8. The left & the right brain

Traditional teaching and training favors a certain learner type with a preference for verbal expression and abstract thinking. This involves usually activities such as thinking in words, talking, writing, reading, calculating, analyzing, which corresponds with abilities of our human brain such as speech, ordering, sequencing, intellectual analysis etc. However, that only makes up half of our abilities.

From modern brain research we know that our brain is divided into two parts, the left and the right brain or the left and right hemisphere. They each are identified with different abilities:



As we can see, traditional teaching and training highly favors the left side of the brain. Learning results are much higher, though, when both sides of the brain are stimulated and involved in the learning process: analytical exercises should be combined with creative, expressive activities. When the less used side is encouraged to cooperate with the stronger side, we usually get a synergy effect meaning $1 + 1 = 5$ (instead of $1 + 1 = 2$). The ability to see relationships and patterns, and make unfamiliar combinations and connections, is the core of creativity. To ignore these abilities and not involve the right side of our brain in the learning process means to limit ourselves unnecessarily and to neglect



our full potential. As we already know we learn best whenever we can link the learning material with corresponding images, drawings, associations, and emotionally touching impressions. It should be a prerequisite for all teachers and trainers to equally involve both sides of the brain of their students during instruction in order to achieve better learning results.

9. Stimulating learning

Thinking requires a lot of energy. To keep our brain active, we use up 18% of our daily input of calories, infants even use up almost 50%. Therefore, before each learning operation the brain asks unconsciously: Is it really worth the effort? The neuronal network of a student needs to be convinced again and again that learning is worthwhile. This cost-benefit-analysis is influenced by prior experiences: If new information can be linked to an existing point of interest, attention increases and the desire for more information develops. Generally speaking, the brain wants to be enticed.



Of course, students have certain preferences, some of which are genetically influenced. Those with an inclination for mathematics will have no trouble learning how to execute mathematical operations. On the other hand, those with a strong aversion against languages will find it very hard learning them. For teachers the latter group of students poses the big problem: How can they be motivated to learn? How can they achieve at least a minimum result?



To equip students with the right learning strategies is one answer to this question. When we are aware of how we learn best we will have far less problems in achieving at least minimum results. How we find out about the individual learner types, how we can plan and organize our learning efforts, and further important details with regard to learning strategies will be the focus of the next unit.

The more associations are touched by a new information, the greater the chance that attention is aroused. If there are no associations that signal points of interest, new information just passes by without getting any attention. Worse, new information can even frighten our students: it is a normal reaction embedded in our genes to be careful when confronted with the unknown or unfamiliar. Our hormones signal “danger” and they prepare our body for running away. In the learning context this means there is a blockade; we are unable to grasp anything. Instead, we build up a strong aversion or resistance, thus preventing any learning at all.

To overcome this blockade, we can make use of the so-called secondary associations, which are related to the environment in which the learning takes place. Secondary associations can be music we listen to while learning something, a particular method like group work or any other feature





to which the learning material is tied. If these secondary associations are positive, it is much easier to recall the information linked to them.



The advantage for learning means that we can package new information in familiar ways, which recall positive feelings. This helps to reduce the fear and stress when confronted with unknown material. We recognize something familiar which in itself is already an achievement and therefore a stimulant for learning. In that context, curiosity is a crucial factor for overcoming this fear; it is a strong motivator for learning new material. Whatever is associated with fun, pleasure and delight, is learned and remembered much easier.

As teachers and trainers, it is our task to motivate students. Motivating means creating an atmosphere conducive for learning: it means to stimulate curiosity, to identify points of interest, to mobilize positive affections and, of course, to present the learning material in a way that recognizes the findings of modern brain research relevant for learning.

10. Consequences for teaching

In teaching and training, the following rules should be considered:

Knowing the learning objectives

The student always needs to be aware of the value and meaning of the learning material. Only then attention and the urge to learn are aroused, and the content is stored sensibly.

Sensible curriculum

When the practical use of learning material cannot be concluded from prior learning units or its relation to reality, it is stored badly in the memory. Hence, it is also useless for later use since it is stored in an isolated way without any linkages. Sequence and structure of a topic have to take the process of understanding into account rather than any specific subject concerns.

Mobilizing affections

When curiosity, fascination, enthusiasm etc. are lacking, the readiness to learn is not aroused. On the other hand, whatever is linked to affections is remembered more clearly and longer, since affections reinforce the input and allow for cognitive and affective perception. Curiosity in particular is a great stimulant for learning and can also help to overcome the fear of the unknown. Presenting new material in a familiar way also helps to reduce this fear and bypass related learning blockades.



Creating associations

Examples and pictorial additional explanations furnish new information with further points of reference for storage in the brain. Graphic description guarantees better transition from the short- to the long-term memory and offers varied possibilities for recalling the information later. The more associations we have when exposed to new information, the higher the possibility of remembering. Associations help to store details and they also arouse attention and interest.

Creating multi-channel messages

The more senses are involved in learning, the higher the retention span. Different input channels offer different possibilities for associations for deeper understanding. This enhances attention and the motivation to learn. It is also easier to remember the new information later. Multi-channel messages also recognize the fact of different learner types with various preferences.

Applying didactical principles:

From the whole to the detail

The whole usually offers linkages to the day-to-day experiences, something familiar. This allows for incorporating new information on different levels. With many points of reference available, also details can be remembered better.

From the known to the unknown

Explaining facts or connections helps to recall known association patterns. To link a new term to known information is much easier than first learning a new term without any point of reference.

From the concrete to the abstract

Whenever a principle, law, proceedings or any other abstract material has to be learned, it is much easier when described as real action. It can be visualized and conclusions can be drawn accordingly to help understand the abstract résumé.

From the simple to the complicated

Complex and complicated processes can be simplified: it is important to show the essentials so that the most important - the basic principle, for example - is understood. This also creates an interest for the details and the more complex matters of a topic.



Linking teaching to reality

Establishing links to real life enhances curiosity and interest and offers more points of reference for storing new information. In the same way, exposure to reality and direct observation of the real object facilitates spatial orientation and allows easier and more accurate understanding. Putting students actively to the test outside of school in a real life situation where they can make use of what they learned usually has a great motivating effect on their performance.

Repeating new information

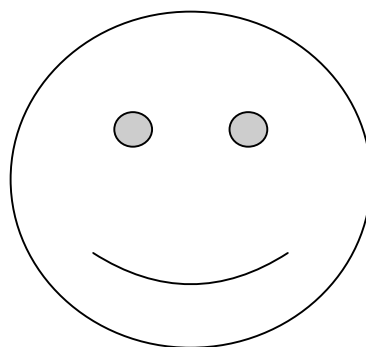
Each learning material needs to be repeated at intervals. It enhances remembering since the learning material appears in a different context and different connections, which once again allows for more associations and linking points. Application – using what has been learned – is the best way of repeating and reviewing.

Involving students actively

Avoid ready-made solutions. Allow students to come up with own solutions for problems and to work independently with media as well as to conduct experiments during natural science classes. Give challenging, suitable tasks already at an early age to foster a positive attitude towards learning.

Making learning enjoyable

Fun and a sense of achievement create an atmosphere conducive for learning. Information linked with positive events and feelings are learned and remembered much easier. Create opportunities for achievement and give praise and recognition as often as possible. Correct mistakes casually; if they are emphasized too much, the contrary may happen and students will just store and recall the wrong information.





Unit 4 Conclusions

1. Learning methodology and the world of employment

As we have seen in the previous units, learning is quite a complex process. While some factors simply have to be recognized, such as the brain's structure in form of the neuronal network, others can be influenced and changed, like learning strategies.

The more we know about learning in general and about our individual learning profile in particular, the better we can organize our learning efforts in order to achieve good learning results. Hence, it is quite obvious that students and trainees will benefit tremendously when they are equipped with learning methodology and knowledge about learning as such.

These benefits, however, are not limited to the time of study and training. The rapid spread of new technologies and the changes in work organization and process sequences in production are dramatically influencing the profile of work. Today's and future graduates from schools and training centers are not only required to have expertise in a particular professional area, they are also expected to have so-called key qualifications or core skills. While workers are still asked to carry out orders, they also have to be able to handle unforeseeable situations: They must identify problems and find the optimum solution. This requires both social and methodological skills. Some of these core skills with examples of essential individual qualifications are:

1. Organizing and carrying out the assignment

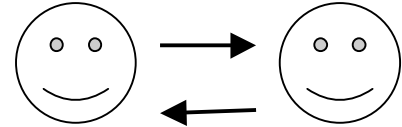
- Determination
- Accuracy
- Systematic course of action
- Organizational ability
- Coordinative ability





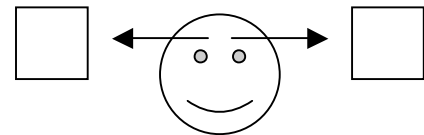
2. Communication and cooperation

- Open-mindedness
- Ability to cooperate
- Ability to work in teams
- Appropriate behavior towards customers
- Appropriate behavior towards colleagues
- Intuition



3. Application of learning techniques

- Using learning techniques
- Deductive thinking
- Ability to transfer methods to other areas
- Thinking in systems



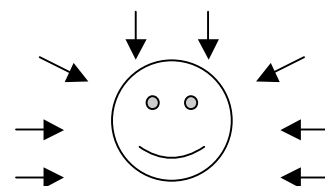
4. Independence and responsibility

- Involvement
- Reliability
- Acting prudently
- Ability to criticize oneself
- Ability to express own opinion



5. Ability to work under stress

- Ability to concentrate
- Perseverance
- Adaptability





For teaching and training this means to equip students and trainees not only with the professional expertise, but also with methodological and social skills. Introducing learning methodology in the curriculum is one major step to prepare graduates for the demands and challenges of the work of employment: It helps them to deal with the constant changes due to new technologies and to upgrade knowledge faster and easier.

2. *The importance of group work*

As mentioned already, the world of employment has undergone tremendous changes with regard to organizing work and production processes. To a large extent, modern manufacturing technology is based on teamwork: Single working steps are united into working procedures and executed by teams. The whole team is responsible for the way they organize work and for the result in terms of quality and quantity.

The ability to work in a team is also required in other work areas. When it comes to research and problem solving, solutions are no longer found by individuals but by whole teams: people with different expertise have to work hand in hand to come up with the optimum solution for a particular problem. Instead of working isolated (one brain), different ideas are put together (many brains), discussed etc. to find the best possible option.

Working together as a team, however, also has to be learned. In daily teaching and training, assignments should therefore be given not only to individuals but also to groups. While teamwork is beneficial for the demands of future work and employment, it also has a favorable effect on learning as such:

Associations

When trying to understand the learning material, it provides more associations, which help to link the new information and remember it better; mixed learning styles also ensure better learning and make it more enjoyable.

Explanations

Difficulties of understanding can be revealed and clarified in discussion; in addition, different opinions and viewpoints can be gained.

Assistance

In cases of uncertainty, it is possible to find assistance and support in another person in the same position; it also saves time since tasks are divided among group members.

Activation

There is a greater challenge to the activity of the individual in a group than in learning on one's own; participating and contributing increase the learning commitment.



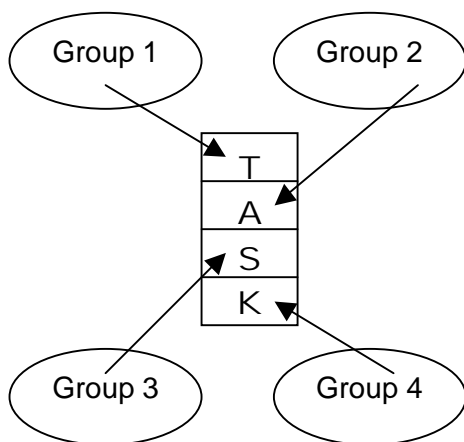
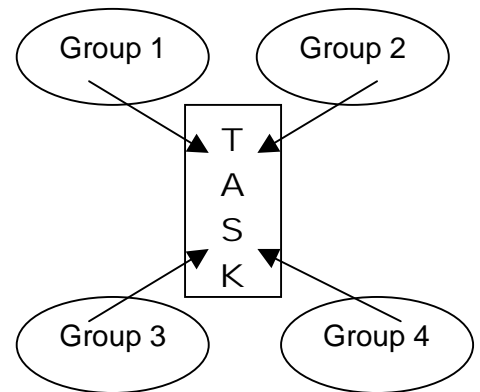
Check of performance

By comparison with others, one's own performance can be assessed more realistically; this can lead to new or additional incentives to learn, thus raising the quality of the work.

Depending on the task the groups are given, there are two major types of group work: the common job group work and the job sharing group work.

Common job group work

means that all groups are intensively working on the solution of the same problem: all groups are given the same task, materials and questions. At the end, each group is asked to present its results. This embodies a repetition, which means reinforcement. The other positive side effect is that the output is higher – more groups mean more ideas, solutions, and contributions. There is also the element of competition and self-critique – which group has the best solution, what are other solutions lacking. At the end of the common job group work, every student and trainee should be familiar with the new knowledge without additional homework.



Job sharing group work

means that every group is working on a particular part of a solution. At the end every group presents the results; these partial contributions are assembled and put together into a final complete result like pieces of a puzzle to a picture. Though this form of group work saves time, learning is not as intensive, since there is no repetition and the results of other groups are usually presented in lecture form without any active involvement of the other students and trainees. In addition, the output tends to be lower because fewer people work on a particular task.



The ability to efficiently work in a team requires a number of social skills such as:

- Fair sharing of work load
- Finding a compromise among different views
- Using convincing technical arguments
- Dealing with criticism
- Accepting the superiority of other teams' results in a fair appreciation

These abilities cannot be trained in conventional ways. They have to be experienced and practiced. Measuring progress in that field is based on observation over longer periods.

As for assessing results of group work, these criteria can be helpful:

- Correctness of matter presented (knowledge)
- How well explained (communication)
- Format of presentation (creativity)
- Team work (social)

As already mentioned earlier, group work is also a good learning strategy: Instead of learning alone, we can form a learning group. The ideal group consists of 2 to 6 people. Among these a kind of working contract is established to define the common objective and goal. The learning then is divided into parts and assigned to group members; the group works together until the plan is completed. While individual strengths can be used, especially with regard to different learning styles, group members can support each other also in other ways by sharing opinions, experiences, knowledge and fears. The learning group is also a good audience to present results to; the feedback helps to tell how well a subject is understood. At the end, learning groups should review how they worked together, so they can improve when tackling future learning projects.

3. *Learning – a broadened concept*

For many years the focus of teaching and training has been the content level of a particular subject. In its approach this style of instruction is concentrated on imparting knowledge (facts, rules, terms, definitions etc.), facilitating comprehension (phenomena, arguments, explanation etc.), creating understanding (connections, systems, processes etc.) and enabling evaluation (judgment of theories, statements, measures etc.).

While this is still of major importance, other areas of learning, such as learning methodology, social skills and affective learning become the focus of attention: As mentioned earlier, information is outdated much faster than it used to be. Consequently,



employers ask for employees who are able to handle information and constantly upgrade their knowledge – in short, employees who have learned how to learn. At the same time, the organization of work processes asks for staff used to work in teams and capable to take on responsibility.

These new requirements should, of course, be reflected in the curricula of schools and training centers. If taken seriously, they will lead to a new approach in instruction based on a broadened concept of learning.

Broadened concept of learning			
Content-subject related learning	Methodological-strategic learning	Social-communicative learning	Affective learning
<ul style="list-style-type: none"> • Knowledge (facts, rules, terms, definitions...) • Comprehension (phenomena, arguments, explanations...) • Understanding (connections, systems...) • Evaluation (judging theories, statements, measures) <p>etc.</p>	<ul style="list-style-type: none"> • Excerpting • Looking up • Structuring • Organizing • Planning • Deciding • Designing • Keeping order • Visualizing <p>etc.</p>	<ul style="list-style-type: none"> • Listening • Explaining • Arguing • Asking • Discussing • Cooperating • Integrating • Facilitating discussions • Presenting <p>etc.</p>	<ul style="list-style-type: none"> • Developing self-confidence • Enjoying a topic/ a method • Developing identification and commitment • Building up values <p>etc.</p>



Unit 3 Handling Information

1. General considerations

One of the core requirements for successful learning is the ability to handle information. As recipients of information in the context of teaching and training, students and trainees are daily confronted not only with inputs in form of lectures, presentations, experiments etc., but also with printed material such as textbooks, articles from newspapers and magazines, internet printouts and the like. All these inputs have to be understood, analyzed, sorted and processed in a way that they can easily be stored and recalled later.

At the same time, students and trainees also have to present information: They can be asked to give a lecture, to inform about the results of group work, to submit a report etc. Oral and written exams also require them to give inputs; the results of these tests indicate how successful they were in handling information.

While of major importance for the time of study and training, the ability to handle information is also vital for the working world: not only is information outdated faster and faster these days, the amount of new information is also constantly increasing.

This unit focuses on the main methodological skills required for handling information in the context of teaching and training. While basic information is given on the areas covered, exercising these respective skills is a necessity for long-term success.

2. Reading techniques

Efficient reading is a crucial step for successful learning. Apart from mere reading skills it involves the ability to stay concentrated to the task and topic, to grasp the content, to filter out the important information and to process it in a way it can be used and/or recalled later. Depending on the amount of information involved, it is also quite time-consuming.

To make maximum use of time, it can be useful to just skim through a text instead of reading it thoroughly. For example, when we want to get a first impression or obtain certain key information of a text, survey reading is a helpful method. The common word-by-word



reading approach is not only tiresome and ineffective in that context; it is also very often a waste of time since only very selective text utilization is required. The following criteria help us to decide when survey reading should be practiced:

Why skimming through a text?

Skimming through a text (survey reading) is useful and makes sense when...

- 1 the topic of a text is not totally unknown to us
- 2 we are looking for specific information in a text answering given or self-constructed questions
- 3 we deal with a longer text of which only a certain part is important for us
- 4 we want to get a first impression of a text before reading it in detail
- 5 we are already knowledgeable about a topic and we only like to verify whether a text contains any new information for us
- 6 we quickly want to know whether a text contains any interesting or important information for us

Rules for survey reading

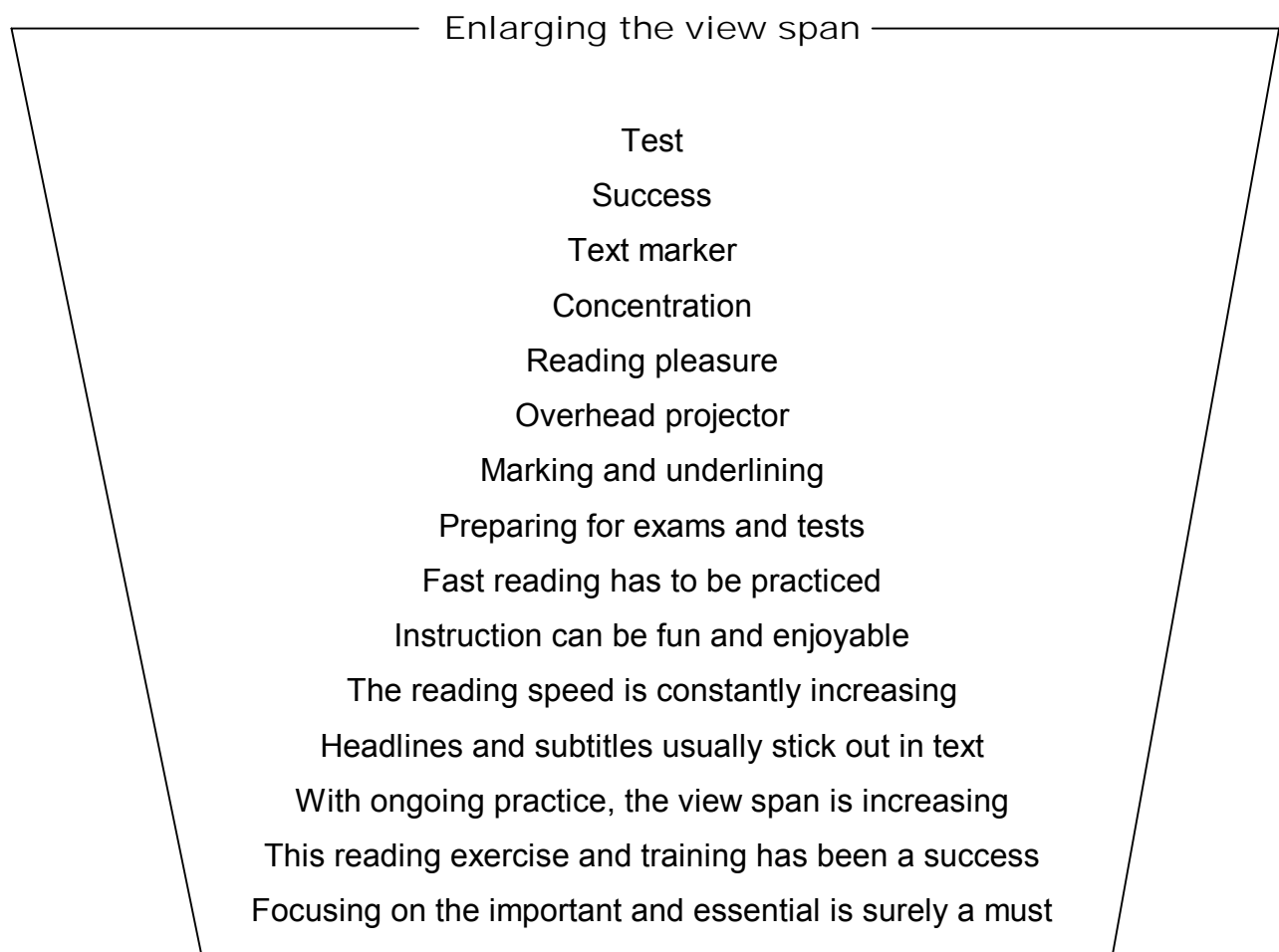
In survey reading it is important...

- ➔ That we remain concentrated so we don't have to read a previous paragraph again since these deviations prevent reading success and reduce reading pleasure
- ➔ That we search for something particular during reading: for terms, numbers, explanations and other information we consider important
- ➔ That we do not focus our eye on single words but on whole word clusters. This extension of the view span can be practiced and learned.
- ➔ That we concentrate on items with special emphasis such as headlines, words in bold print and summaries at the end



- ➔ That we don't take every single word serious and try to remember it since our memory could not keep up with this demand. We have to be selective. Focusing on the essential is a must!
- ➔ That we identify the crucial words representing the meaning and the mental structure of the author, working from top to bottom
- ➔ That we, if required, jump from paragraph to paragraph to get an overview and to judge whether there is anything important for us

When conducting exercises in survey reading, a time limit should be given according to the level of the reading ability of a respective class/group. Important is that the work is done under real time pressure. With the help of the word pyramid below we can exercise to enlarge the view span, thus increasing reading speed: we take a sheet of paper or cardboard and cut out a window at the top as high and broad as the last line of the pyramid. Then we cover the pyramid with the paper and start pulling it slowly downwards, thus revealing one line after the other. We make a note of the word/sentence we see or any questions we may have.

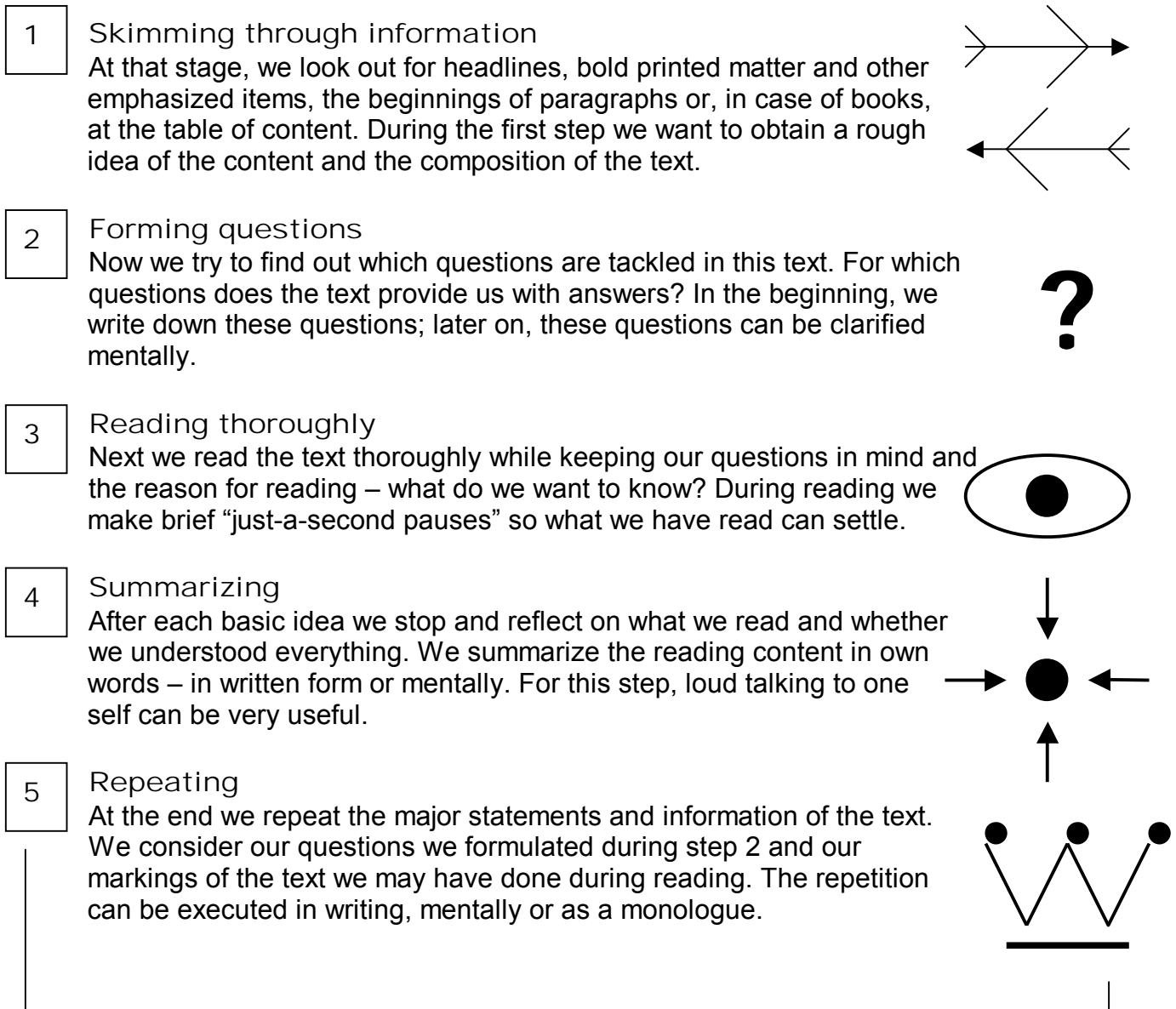




The best way to practice is with a partner who pulls the sheet for us and controls our answers of what we have seen. Other pyramids can be made for further practice. This helps to improve reading speed by enlarging the view span.

Reading speed and survey reading are both used in the 5-step reading method: This method is a systematic approach for reading. While it may not be needed all the time, it should be explained and practiced often enough since it improves reading results considerably. Else, students and trainees may just spend a lot of time reading without arriving at useful results.

The 5-step reading method





3. Summarizing techniques

Evaluating a text and summarizing the information in short statements, charts, sketches or other graphic drawings is a major skill in handling information. A first step can be marking and underlining. If executed in the right manner, it helps us to recall the important information of a text.

In that context, a text marker is a very useful tool since it makes important parts of a text catching one's eye. When reading the same text for repetition purposes later, it is usually enough to concentrate on the marked parts: they bring back all the other important information of the text. In a way, the marked parts have the function of a key: they open up areas of our memory in which we have stored the connected information. For example, when marking the word "high pressure", this word helps us to retrieve other information that we have associated with it when reading the text for the first time. (What happens when we have high pressure as a weather condition? How does it occur? In what way does it affect people's health? Etc.) We hardly have to read this sideline information again since it reappears with the respective key word.

However, this requires that we use the text marker only for the key words. If we mark whole sentences or even paragraphs, the eye does not know on which part to focus. When marking too much, our memory fades and for repetition purposes we have to read the whole text again. This is time consuming and also boring. Therefore, we should only mark key words and make sparing use of text markers, so our eye immediately catches the key words which trigger off our memory. We should also stick to one marker color; various colors may lead to confusion. Important sideline information can be marked with a fine red felt pen: Red as a signal color can easily be recognized and the fine line distinguished from the bold marked parts.

Rules for marking

- 1 We keep a pencil, ruler, marker and fine red felt pen ready for use on our desk
- 2 We skim through the text to get a first impression
- 3 We underline important parts with pencil to recognize the text structure. Pencil can be easily erased, so it is no problem if too much is underlined at this stage
- 4 We skim through the underlined parts to identify the key words, which, after careful consideration, we finally mark. Yellow has proven to be a good color.



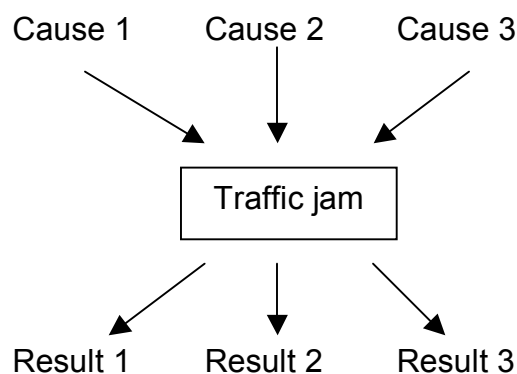
- 5 We underline sideline information with a fine red felt pen. We are careful not to underline too much.
- 6 We write down the key words on a separate sheet to check whether we have understood everything.
- 7 When we remember the important sideline information at this point, we know we have chosen the right key words.
- 8 We will finally see that we can remember easily the key words, which will help us to recall most of the other information. The details are linked to the key words! And, after all, we cannot remember everything.

As said already, information can also be summarized in charts, sketches or other graphic drawings. Most of us remember information much better once it is associated with images. The crucial factor in that context is that we develop our own individual summaries and structures, which we then translate into graphics. While students and trainees may have difficulties structuring a text, their learning results will improve when they get sufficient assistance and practice in these techniques.

Here are two examples how information can be translated into graphic structures:

Example 1:

A text about the problems heavy traffic causes in a city like Manila

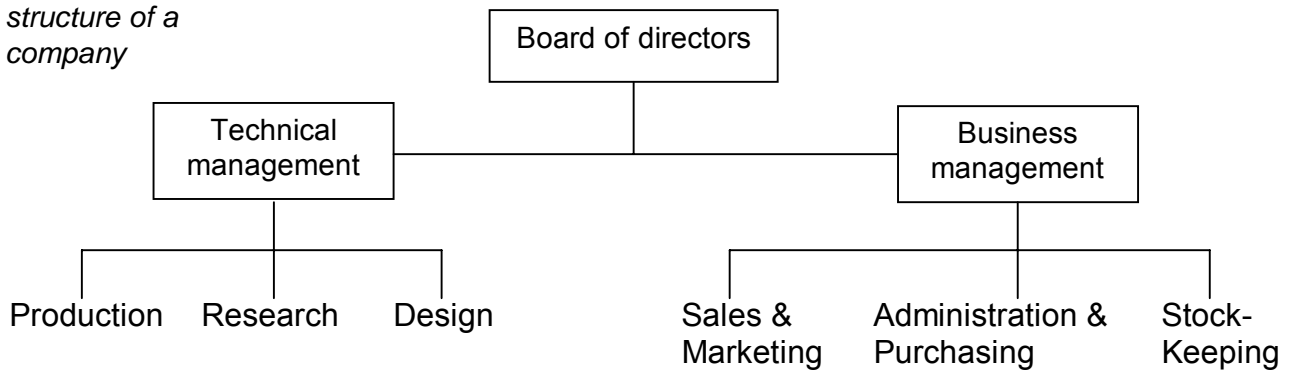


This visual aid is not only useful for processing information, it can also be useful when delivering a short speech on the topic: While it ensures that all important inputs are mentioned, it allows for free phrasing which makes any speech always far more attractive than just reading a pre-written text.



Example 2:

A text about the structure of a company



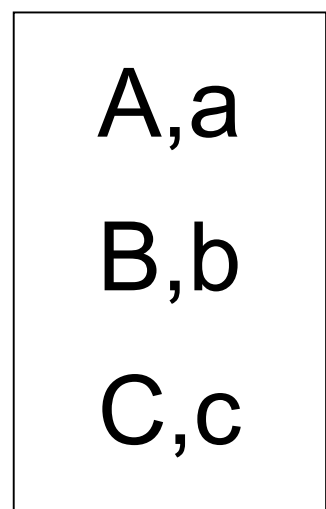
This visual aid not only helps to structure and understand information given purely in words, it also enhances remembering this data.

4. Researching techniques

So far, we looked at handling information on condition that it is already available. However, handling information can require to research for it: a particular problem has to be solved, an answer to be found for a question, material for a presentation to be put together. To obtain or verify information, we can make use of libraries, the Internet or special resource persons who are experts in their field. The requirement here is that we know how and where to look for what particular information.

With regard to reference books such as dictionaries, subject catalogues or encyclopedias, it entails dealing with content tables and catchwords, managing the alphabet, quick leafing through books to get a first impression, fast skimming through a text and recognizing the wanted terms of information.

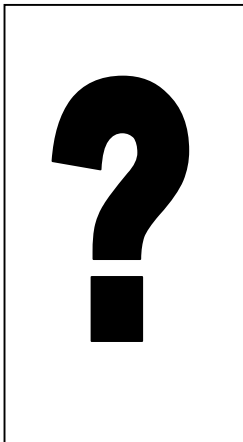
Once again, exercising how to work with reference books is crucial for success. Competing games with material such as an atlas, various specialized dictionaries, telephone directories etc. combined with crossword puzzles, sorting and spell check exercises can be very helpful. Like in survey reading, a tight time limit should be set to stimulate quick and speedy looking up.



Whenever a library is at hand, a visit should be made to ensure students and trainees know how to avail of the respective books. As for the Internet, they should be familiarized with the basic research strategies when using search engines. What holds true



in general, holds particularly true for the Internet: the more specific the question (meaning the term for the search request), the more specific the answer. In the age of information we usually do not suffer of lack of information, we are rather confronted with too much information!



When we are conducting research, we usually try to find an answer to a given topic and/or problem. Here, the art of questioning can be very helpful. In general, those who ask questions usually benefit more from learning. Questions are like focal points in our memory to which the answers are glued. This tie between question and answer, however, requires that we ask goal-oriented and well thought-out questions. Although all of us started life with an insatiable curiosity, most of us learned that answers are more important than questions. Hence, the art of questioning is usually underdeveloped. A varied questioning training helps us to develop topic-centered questions, to relate questions to particular areas and to establish question-answer connections. Thus we not only further our ability to ask, but also to understand and answer questions.

The ability to ask questions not only helps us in research, it can also enhance our problem-solving skills. For most of us this will require shifting the initial emphasis away from focusing on “the right answer” and toward asking, “Is this the right question?” and “What are different ways of looking at this problem?” Successful problem solving often requires replacing or reframing the initial question. Questions can be framed in a wide variety of ways, and the framing will dramatically influence our ability to find solutions.

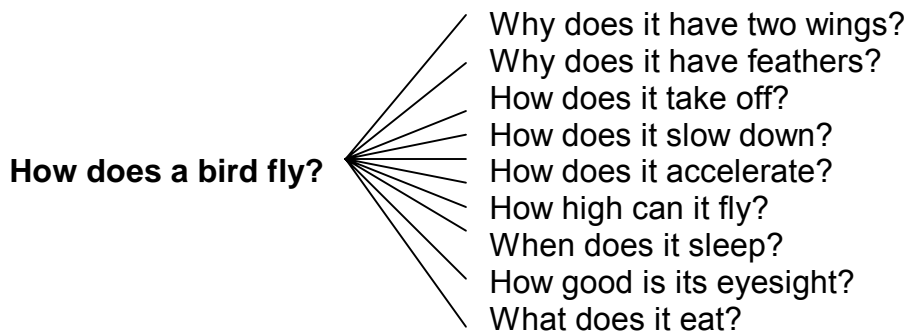
Questions can be grouped according to three major areas:

Knowledge	Comprehension			Values
	Causes	Results	Countermeasures	
Asking for: Terms Numbers Names Details to be memorized	Lead further into topic and require thinking, combining and arguing			Concern personal opinions and values

Who?
 What?
 Where?
 When?
 Why?
 How?



How can we sharpen our question-asking skills so that solutions will start to come to us? We can begin by asking simple, “naïve” questions children might ask, such as, “Why the hammer blow causes the nail to jump?”, “Why is the sky blue?”. Aiming to ask questions we have not raised before is a way to stimulate our curiosity, which again stimulates learning. Creating questions is also a good start to research on a particular topic. Here is one example focusing on the image of a bird in flight:



Other topics for creating questions could focus on images such as flowing water, the human body, a landscape, reflected light, a knot or braid.

When we want to obtain and/or verify information by conducting an interview with a resource person, we also need well thought-out, goal-oriented questions. Only when we are aware of what we want to know can we ask the kind of questions that prompt the answers we are looking for. What stimulates our own mind, can also stimulate the mind of our resource person: Asking surprising, unexpected questions can lead to interesting, unique insights and may also help to reveal the personality of our interview partner!

5. Working tools

Once we have compiled the information we need, the next step in handling information usually includes processing and/or storing it. For that matter, we have a number of useful tools, which help us to keep order in terms of filing and presenting information. Exercises on how to use these learning aids help us to be aware of their purpose and correct use. Once familiarized with these items, competitions among students can be held who comes up with the most creative learning poster.



Writing utensils:

- Pencil
- Fountain pen
- Felt pen
- Ballpoint pen
- Marker
- Text marker
- Crayon

Designing

- Ruler
- Dividers
- Set square
- Protractor
- Lettering guide
- Curve stencil
- Drawing board

Correcting mistakes:

- Eraser
- Correction fluid
- Correction tape
- Plain stickers

Cutting & Sticking

- Scissors
- Cutting knife
- Puncher
- Sharpener
- Glue stick
- Fluid glue
- Scotch tape
- Masking tape

Design elements

- Symbols
- Stickers
- Frames
- Backdrops
- Ready-made letters

Storing notes

- Card-index box
- Index card
- Alphabetical index card

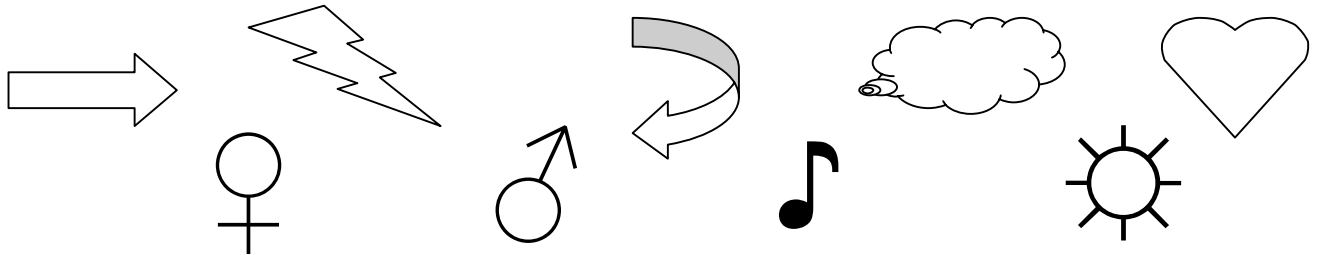
Fastening papers

- Paperclip
- Stapler
- Fastener
- Binder

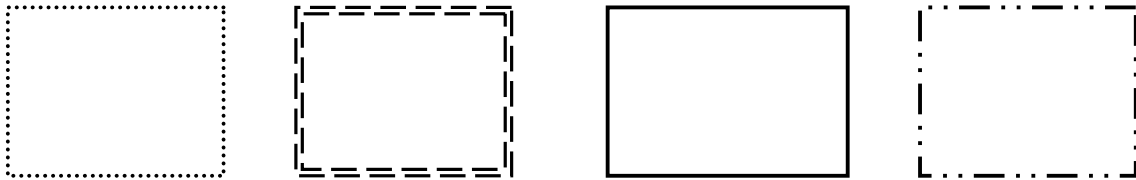
Filing papers

- Filing tray
- Clear sheet protector
- Folder
- File
- Index sheet
- Divider

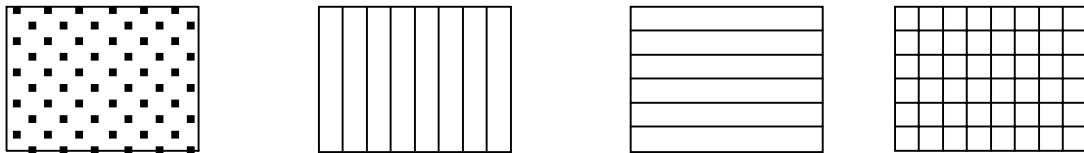
While basic skills such as precise cutting out of shapes and figures, tidy gluing, accurate drawing of lines etc. are usually learned at an early stage, proper execution should be monitored and, if necessary, reinforced through exercises. Often the state of students' exercise and notebooks leaves a lot to be desired, an indicator that they are not aware of the importance of good visual presentation of learning material in achieving high learning results: It is much easier to learn material that is well structured and presented than confusing, unsystematic material hardly legible. The following page displays a variety of samples that can be used in design and layout.



Examples of symbols and design elements



Examples of border designs



Examples of marking areas

DESIGNING

- Designing notebooks
- Designing reports
- Designing posters
- Designing transparencies

► **Designing** ◀

Designing notebooks

Designing reports

Designing posters

Designing transparencies

Examples for layout & design



The next set of examples shows how the same information can be presented in different ways: While example 1 and 2 only differ with regard to the lay out, example 3 is also shortened and reduced to the essential information.

Example 1

THE USE OF SCAFFOLDS

Definition: A scaffold is a framework of metal or wooden/bamboo poles and planks used as a temporary platform from which building repair or construction is carried out. Dependent scaffolds are usually fixed on a house or a wall and cannot stand freely while there are poles only on one side of the scaffold while the other side is connected with the building, which gives it a proper stability. Independent scaffolds do not require the support of any wall or building because of having poles on both sides, which allow erecting them independently. Scaffolds can carry workers and material but one must be careful not to put too much load like blocks and mortar so that the planks cannot carry the load and will break down.

Example 2

The Use of Scaffolds

Definition:

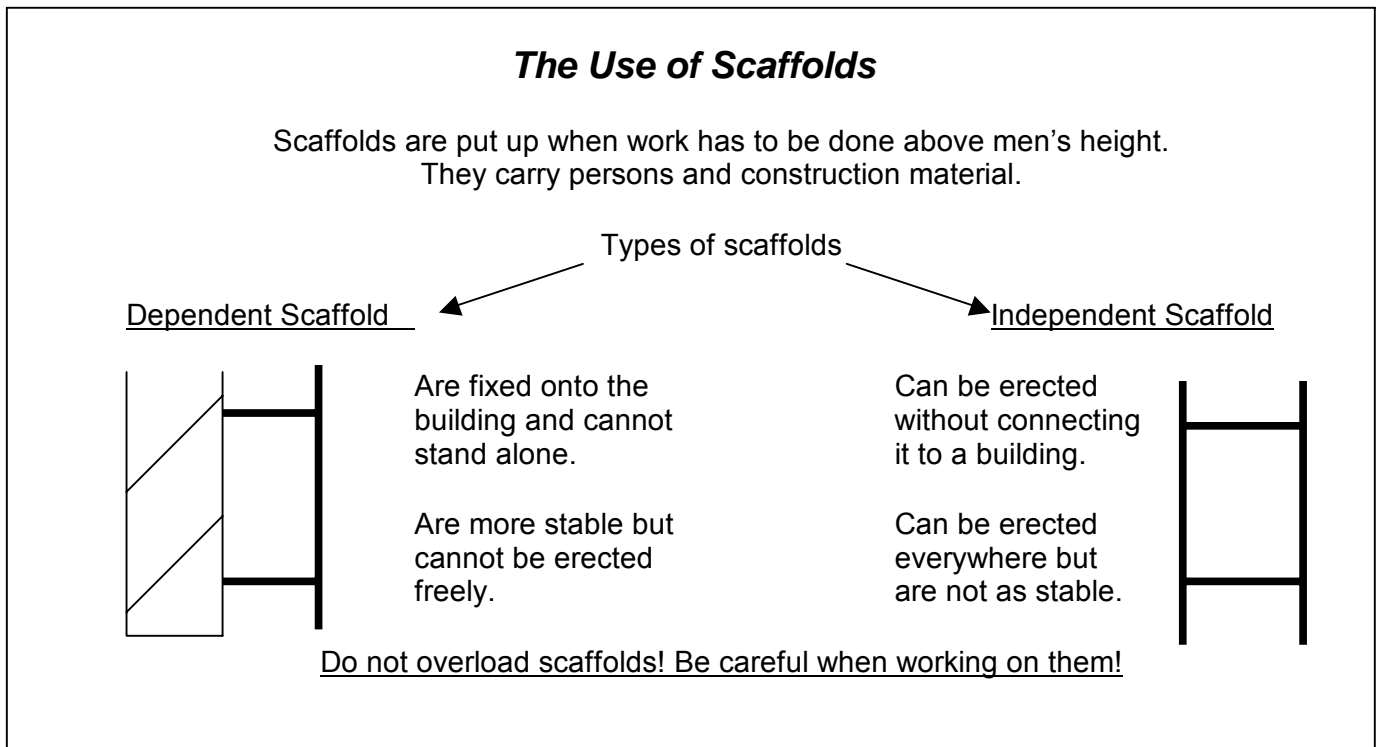
A scaffold is a framework of metal or bamboo/wooden poles and planks used as a temporary platform from which building repair or construction is carried out.

Dependent scaffolds are usually fixed on a house or a wall and cannot stand freely while there are poles only on one side of the scaffold while the other side is connected with the building, which gives it a proper stability.

Independent scaffolds do not require the support of any wall or building because of having poles on both sides, which allow erecting them independently.

Scaffolds can carry workers and material but one must be careful not to put too much load like blocks and mortar so that the planks cannot carry the load and will break down.

Example 3



6. Visualizing techniques

Good visualization not only enhances understanding, it also helps to remember new information. The various degrees of improvement can easily be seen in the examples above: While number 1 just gives a 1:1 information, number 2 already structures it by simply introducing paragraphs and underlining the key words. Number 3 goes a step further by incorporating illustrations and reducing the information to the most important parts.

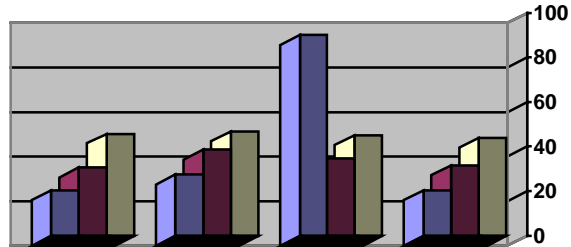
While it is important that teachers and trainers make use of visual aids during instruction, it can be of great benefit for students and trainees to be actively involved in the visualization process themselves: Instead of presenting them with the finished product, they can be asked to “translate” text, figures and statistics into meaningful charts and tables on their own. The more they practice this skill, the more they can apply it when learning by themselves, e.g. when summarizing information. At the same time, this kind of constructive thinking also improves their understanding capability when asked to interpret charts and tables.



Charts can be used for different purposes. The main are:

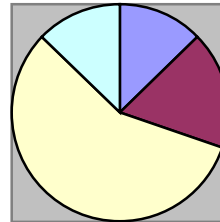
Column chart

Comparison of various sizes



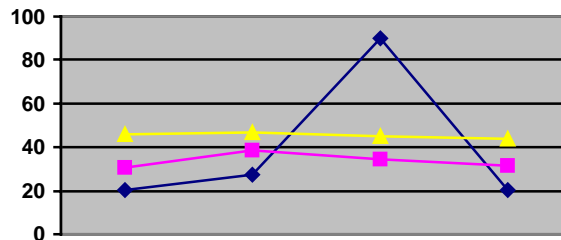
Pie chart

The whole and its parts



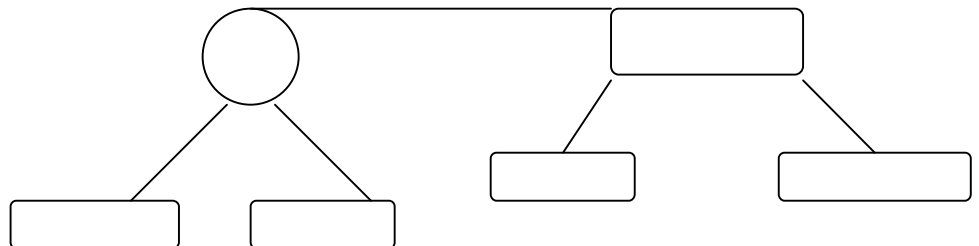
Curve chart

Visualizing developments



Flow chart

Visualizing structures & procedures





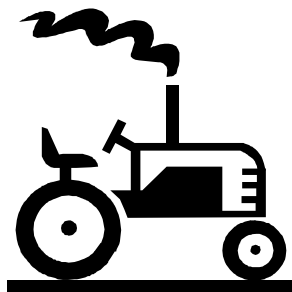
Apart from charts, many other forms can be used to visualize information, such as diagrams, tables, word clusters, definition networks, structural trees and so on. As we said already, visualizing techniques are also very useful for summarizing information.

When doing group work, students and trainees can also be asked to prepare a visual aid that supports the report on results they give to the whole class. While the visualizing process itself will already enhance understanding and learning of those actively involved, it will also be of benefit to the whole class: If only presented verbally, we remember about 20% of information. If an oral presentation is combined with visual aids, the retention span already increases up to 40%.

Whatever form we choose for visualizing information, the most important requirement is that it is clearly arranged and easy to remember.

Example “Diagram”

A schematic drawing can be used to illustrate and simplify complicated technical and other learning material, e.g. engines, machinery, the human body etc. Diagrams help us to understand and remember information better, particularly when having been drawn by ourselves. In textbooks, they usually are labeled already; for reviewing purposes we can cover the proper terms and try to label the diagram ourselves. Terms we find hard to learn can be covered with another color so they immediately stick out when we do another review.



- Exhaust pipe
- Steering wheel
- Driver's seat
- Engine
- Wheels

Example “Table”

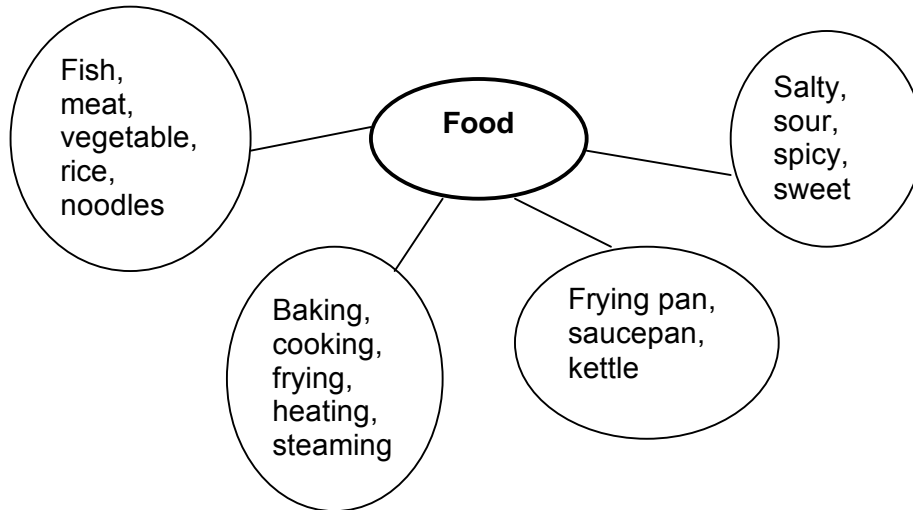
Tables are useful to list information that can be grouped according to categories. They help to structure and clearly arrange information, which else may be confusing if only presented as plain text.

Continent	Country	Capital
Asia	Philippines	Manila



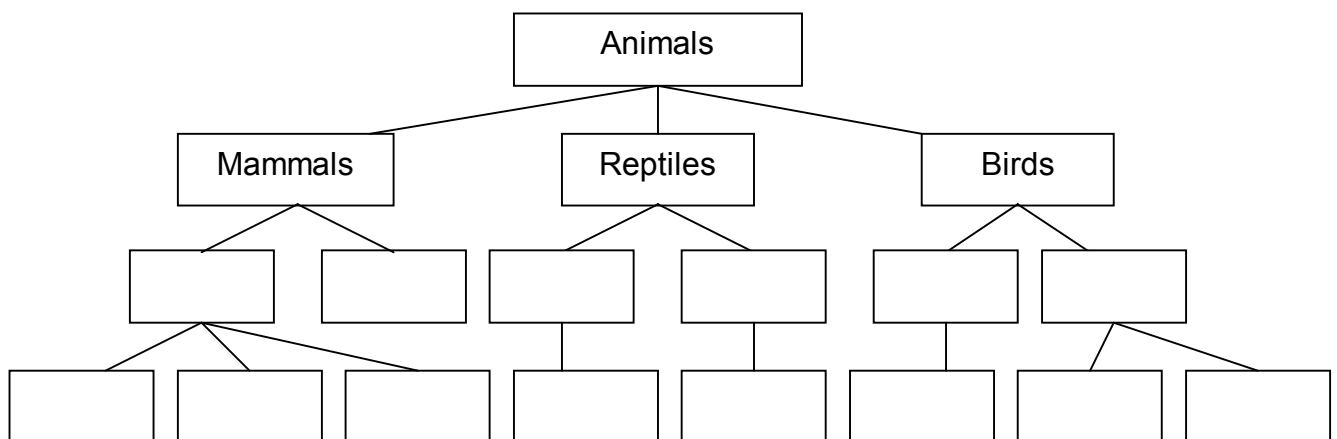
Example “Cluster”

Clusters are another way to group information. While the heading or generic term is in the center, terms related to it are arranged around the center by groups. Clusters can also be used to visualize key words with regard to a particular topic. They are also very useful in processing the results of brainstorming that have been noted on meta-cards.



Example “Definition network”

Definition networks can take on many different forms. The one below is hierarchically structured; others can display a causal structure visualizing causes and consequences of a particular problem.

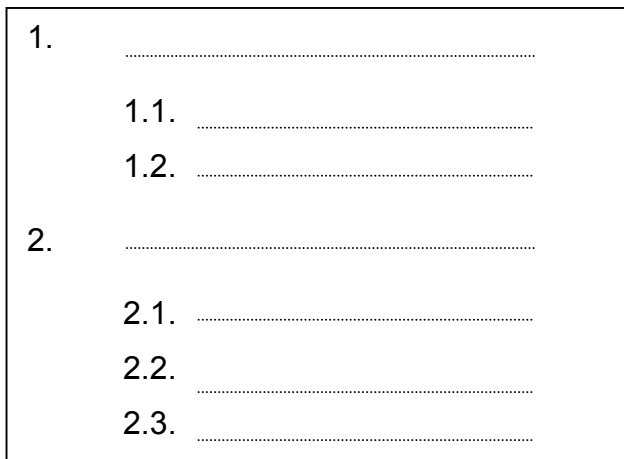




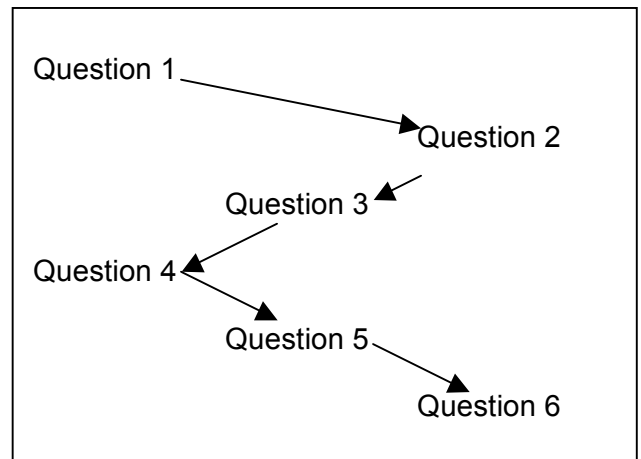
Visualizing techniques are not only useful when summarizing or presenting available information to others, they can also be used in preparation for a presentation. Though students and trainees are mostly required to copy, make notes or use other forms of reproductive writing, training and study also involve writing reports, presenting papers and giving a lecture.

Usually, it is not enough just to start writing about a topic. If not given any thought beforehand, we may forget important aspects or not keep to the point. The first step therefore is to collect information and ideas, after which the material has to be sorted and sequenced in a way, that one point leads to the next. This outlining guarantees a logical flow of information and arguments. A very helpful exercise in that context is preparing a visual framework for writing. If executed thoroughly, the writing process itself will hardly pose any serious problems.

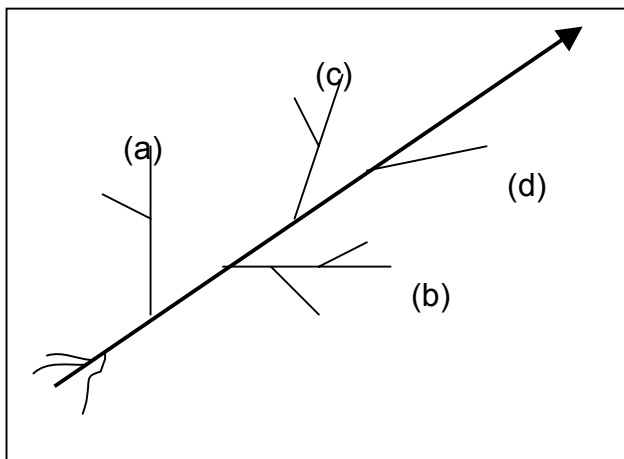
Frameworks for organized writing



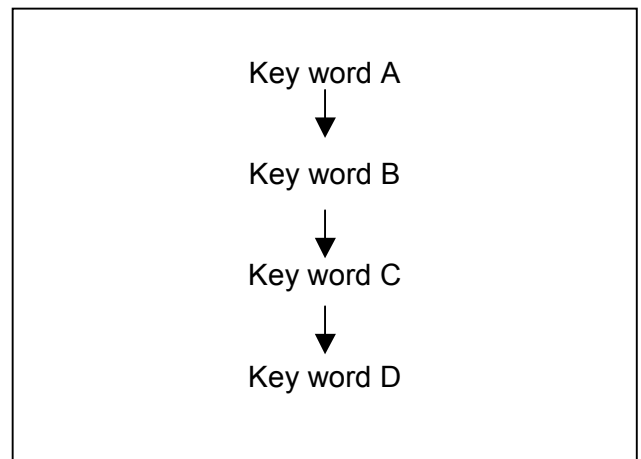
Plan for outline



Chain of questions



Tree frame



Chain of key words

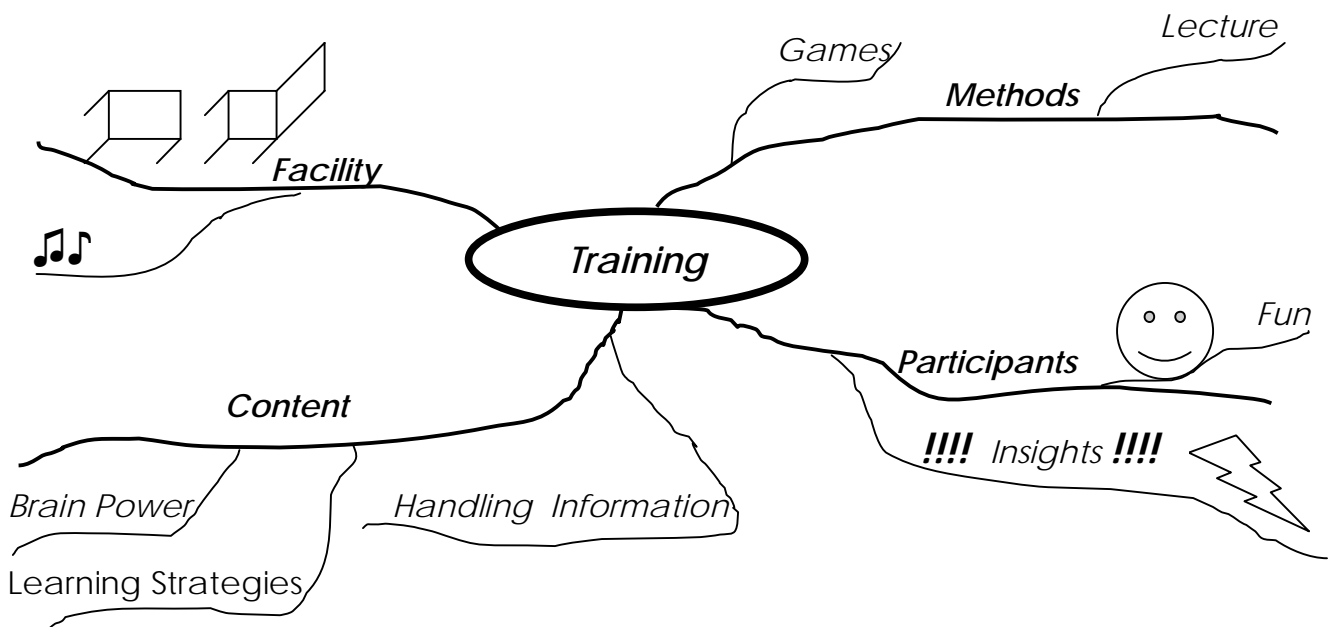


7. Mind mapping

Although valuable as a tool for structuring ideas in a formal, orderly fashion, outlining is useful only after the real thinking has been done. Trying to generate ideas by outlining, we will find that it slows us down and stifles our freedom of thought. We could also say it is illogical to try to organize our ideas before we have generated them!

Outlining is a linear note-making system, which excludes our brain's capacity for color, dimension, synthesis, rhythm and image. Instead of variety, it guarantees monotony; it only involves the left hemisphere of our brain, the logical brain, while suppressing the creative half. However, when we start to think about a particular topic, chances are that ideas, key words, and images float into mind, one associating with the next. Instead of constructing whole paragraphs or ordered outlines, our mind jumps from one idea to the other; we daydream and doodle all of which is part of the creative thinking process. Mind mapping is a method for visualizing and continuing this natural thinking process on paper.

The example below shows a sketch of a mind map about "Training". While the topic of the mind map is printed in bold letters at the center, major key words related to it are arranged around it and linked to the center by branches. Whenever possible, symbols and drawings are used instead of words.



Mind mapping allows us quickly to start and generate more ideas in less time. While all outlines tend to look the same, each mind map looks different. Thus, the result can be remembered much easier due to its particular characteristics.



Mind mapping nurtures our unique, individual self-expression; regular practice will help us to discover our own originality. All we need to begin mind mapping is a topic, a few colored pens, and a large sheet of paper.

Rules for Mind Mapping

1. We begin with a word, symbol or picture representing our topic.
We put it at the center of a blank page.
We use the paper in landscape format.
2. We write down key words.
We connect them with lines (branches) radiating from our central image.
We print key words for easier reading.
We print one key word per line/branch.
We create side branches for points related to the key words.
3. We use colors, pictures, dimensions and codes for emphasis/association.
We highlight important points, e.g. using text marker.
We illustrate relationships using colors, arrows etc.

Mind maps are mirrors; they show us how the brain looks and works. At the same time, they also stimulate the right and the left hemisphere of the brain. While they make use of linking, their visual excitement helps the memory: ideas are easier to recall. Therefore, they are also easy to review, that is to be recreated from memory and checked against the original. They save time since they only record key words.

We can use mind maps for:

- Teaching/training
- Making a speech/presentation
- Project planning
- Writing reports/essays/books
- Brainstorming sessions
- Problem solving
- Creativity
- Taking minutes



8. Seminar papers

When asked to present a paper, we can make use of all the various techniques in handling information: from researching information over reading and evaluating it to structuring, sequencing and designing it. As for students and trainees, they must be familiarized with these techniques and made aware of the features to be considered when preparing a paper.

Papers usually consist of three major parts:

Introduction	Topic, reasons for topic, importance of topic
Main part	Development of central ideas/main bulk of information
End	Summary/Result/Conclusion

The following features should be considered:

Title page	Title/topic, subtitle, author, purpose of presentation, month & year
Table of content	List of numbered chapters and respective page number
Bibliography	List of books used for writing the paper stating name of author, title, place and year of publishing, appearing in alphabetical order
Quotes	identified by quotation marks, statement of source inclusive page number



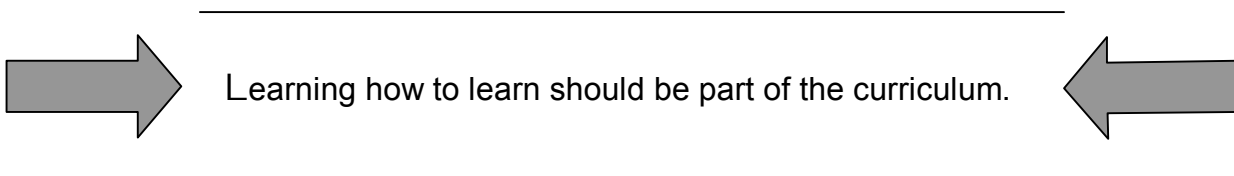
Unit 2 Learning Strategies

1. The importance of learning methodology

When learning, many students feel insecure since they lack the needed methodological competence and routine. In the classroom, methods are usually teacher-oriented: it is the teacher who prepares the learning units for the students. In turn, students often feel helpless when not given instructions by a teacher. Simply calling on students from time to time to use different learning methods on their own is not enough: methods have to be taught as well. Since they can only be learned through applying them, repeated and varied exercises must be part of the classroom activities.

The emphasis on the subject matter as such in most curricula leads to the neglect of learning methods. The importance, however, of methodological skills is increasing in many job related areas. Also, life-long learning has become a regular feature of the working life. Therefore, education should be more than just teaching the subject matter. Education should also aim to equip students with sound methodological skills so that they will become competent, self-reliant learners.

This will also help to improve learning results: Students, who have learned how to learn on their own, are usually higher motivated and thus perform better.



A first step in that context is to assist students to become knowledgeable about their own preferences for learning. Being aware of our own learning style allows us to make use of tips and suggestions that comply with our individual pattern. Thus we can also compensate for inputs delivered in a way we do not favor.



2. *Input channels and learning styles*

As we saw in Unit 1, we all develop individual learning patterns. These can be grouped according to three major learning styles related to the sensory input channels of looking & seeing, listening & hearing and touching & feeling:

Visual

Visual learners find it easier to take in new information through pictures, diagrams, charts, films etc.

Auditory

Verbal learners find it easier to take in new information through the spoken word.

Kinesthetic

Kinesthetic learners find it easier to take in new information through copying demonstrations and getting physically involved.

We may dominate in one style and have a preference for another. Previous learning may have been hindered if it did not cater for our learning style. Schools for that matter usually are not geared to kinesthetic learners. To find out which channel we have an inclination for, the following statements will give us a first idea.

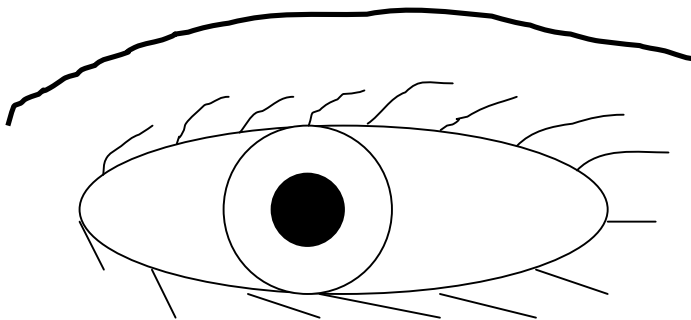
<input type="checkbox"/>	When I touch an object and play with it, I can describe it much better as opposed to just thoroughly looking at it.
<input type="checkbox"/>	Only when I have made a paper airplane myself do I know how it works. From observing alone I cannot remember it.
<input type="checkbox"/>	Explaining me how to operate a machine or equipment, or being able to observe an experiment during instruction, I remember the process much better as opposed to only having a hands-on experience.
<input type="checkbox"/>	I can find a way through town easier when I not only have been explained or shown it on the map, but also traced the route with my finger.
<input type="checkbox"/>	I understand the design of a blossom or leaf better when looking at a drawing in a book than by examining it myself.
<input type="checkbox"/>	I remember experiences better than conversations or what I read.



The following statements help us to double-check whether we are aware of our preferred learning style followed by some tips.

Visual learners

- ◇ Use phrases such as 'I see what you mean', 'I get the *picture*', 'That *looks* right'
- ◇ When relaxing, prefer to watch a film or video, go to the theatre or read a book
- ◇ Prefer to talk to people face to face
- ◇ Fast talkers, dislike listening to others
- ◇ Forget names, remember faces
- ◇ When lost or need directions, prefer a map
- ◇ When inactive, tend to doodle or watch someone/something
- ◇ When angry, are silent and seethe
- ◇ Reward people with a note or card
- ◇ Well dressed, tidy and organized



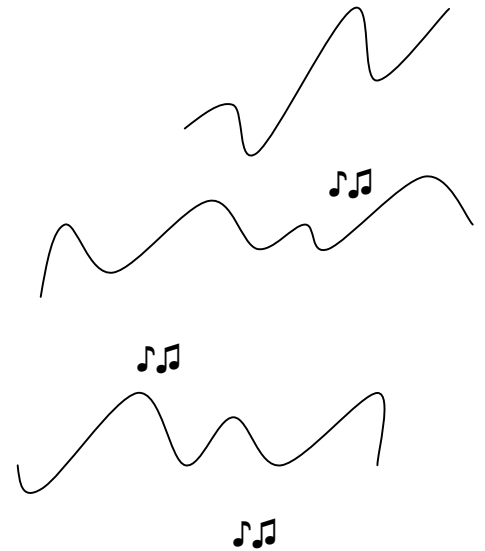
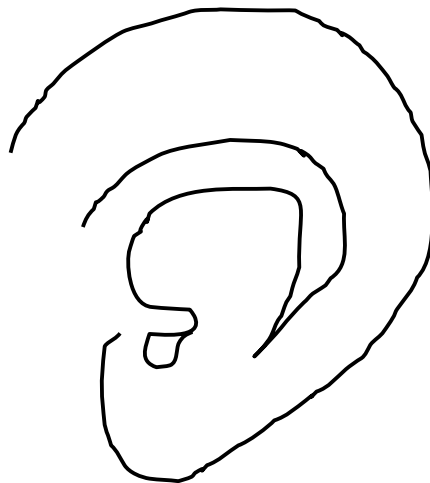
Visual learners learn best by:

- Writing down key facts or, better still, mind map
- Visualizing what they are learning
- Creating pictures/diagrams from what they are learning
- Using time lines, for remembering dates
- Creating their own strong visual links
- Using pictures, diagrams, charts, film, video, graphics etc.



Auditory learners

- ◇ Use phrases such as 'I *hear* what you are saying', 'That *sounds* right', 'That *rings* a bell'
- ◇ When relaxing, prefer to listen to music or radio
- ◇ Prefer to talk to people on the phone
- ◇ Enjoy listening to others, but impatient to talk; talk in a rhythmic voice
- ◇ Forget faces, remember names
- ◇ When lost or need directions, prefer to be told
- ◇ When inactive, tend to talk to themselves or others
- ◇ When angry, express themselves in outbursts
- ◇ Reward people with oral praise
- ◇ Do not like reading books or instruction manuals



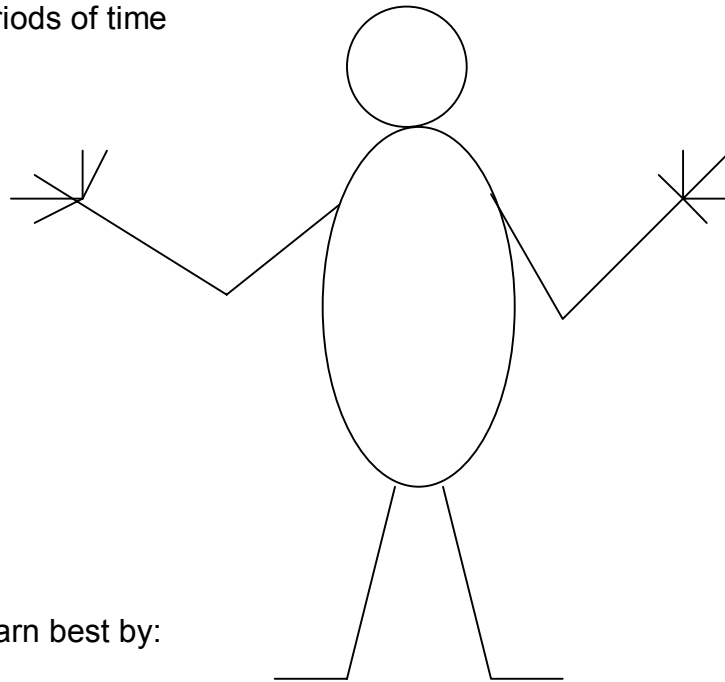
Auditory learners learn best by:

- Hearing a seminar, presentation or explanation
- Reading aloud to themselves
- Reading with emotion or accent
- Making a tape of key points to listen to in the car, whilst ironing etc.
- Verbally summarize in their own words
- Explain the subject to someone else
- Use their own internal voice to verbalize what they are learning



Kinesthetic learners

- ◇ Use phrases such as 'That *feels* right', 'I found it easy to *handle*', 'That *touched* a nerve'
- ◇ When relaxing, prefer to play games and sport
- ◇ Prefer to talk to people whilst doing something else
- ◇ Slow talkers, use gestures and expressions
- ◇ Shake hands with people they meet
- ◇ When lost or need directions, prefer to be shown the way
- ◇ When inactive, fidget
- ◇ When angry, clench their fists, grit their teeth and storm off
- ◇ Reward people with a pat on the back
- ◇ Cannot sit still for long periods of time



Kinesthetic learners learn best by:

- Copying demonstrations
- Making models
- Recording information as they hear it, preferably in a mind map
- Walking around whilst they read
- Underlining/highlighting new information/key points
- Putting key points on to index cards and sorting them into order
- Getting physically and actively involved in their learning



Learner Type Test

Described below are different ways of learning. To each statement put in a number in the box at the right according to how much you remember using this particular way of learning: Put 3 when you remember a lot by using this way of learning. Put 2 when you remember a number of things by using this way of learning. Put 1 when you remember only a few things by using this way of learning.

Ways of Learning

- a) I prepare a chart when working with a factual text.
b) The teacher gives a lecture on the lesson topic.
c) In biology, I collect various plants, dry them, stick them in a folder and write short explanations.
d) Our teacher shows us a cartoon (no comments) about smoking.
e) A student reads a text from the textbook to the class.
f) I look at the pictures and drawings in the textbook.
g) I prepare a drawing covering a learning unit.
h) I listen to an English language audiocassette.
i) The teacher shows us slides concerning a learning topic.
j) The teacher explains to me how the President is elected.
k) I write the words I have to learn on a notepad.
l) I look at an exhibition in the museum.
m) I read a text in the textbook.
n) A student reports on the results of his/her working group.
o) I conduct a simple experiment during the chemistry lesson.
p) I listen to a debate in the radio on an actual topic.
q) I look at a picture book about daily life in India.
r) I note down the most important information of a text.



Add the numbers you entered in the boxes!

- Auditory learner type (hearing): b + e + h + j + n + p =
Visual learner type (seeing): d + f + i + l + m + q =
Kinesthetic learner type (doing): a + c + g + k + o + r =



All previous tests and exercises may indicate that we favor a certain input channel but that we also remember well when involving another input channel. As we know already, multi-channel messages in general are most successful to achieve high learning results. For reading, for example, this could mean to

- Visualize the key message
- Read aloud or hear the words internally
- Get physically involved – underline, highlight, mind map etc.

Thus, various input channels are catered for and involved in the learning process. This is a good way to improve learning results.

3. *Input channels and memory performance*

How well we remember newly learned information, depends to a large extent on the input channel involved in acquiring this new information. The following test is related to the performance of our sensory and short-term memory while it also helps us to find out what preference we have with regard to the input channel.

The test involves the three major learning styles: kinesthetic, audio and visual, the latter being divided between reading and observing. After each presentation of words to be remembered, mental arithmetical exercises are being conducted for 30 seconds (see box below). Then, 30 seconds are given to recall the words/terms presented. The result of correctly remembered words has to be transferred to the assessment sheet.

First, the person conducting the test shows different words one by one for about two seconds each followed by 30 seconds mental arithmetic and 30 seconds for recall.

Reading:

Plastic bag	rice	candle	newspaper	basket
Bicycle	cat	soap	forest	money
Horse	television	shop	guitar	bucket

Next, he/she reads a list of 15 words loud and clearly with an intermission of two seconds between each word followed by the same procedure as described above.

Hearing:

Street	mountain	pig	bread	slippers
Plate	wardrobe	bus	lamp	river
Umbrella	stamp	hut	radio	flower

Then, 15 drawings are shown representing one item for two seconds, again followed by mental arithmetic and 30 seconds for recall.



Seeing:

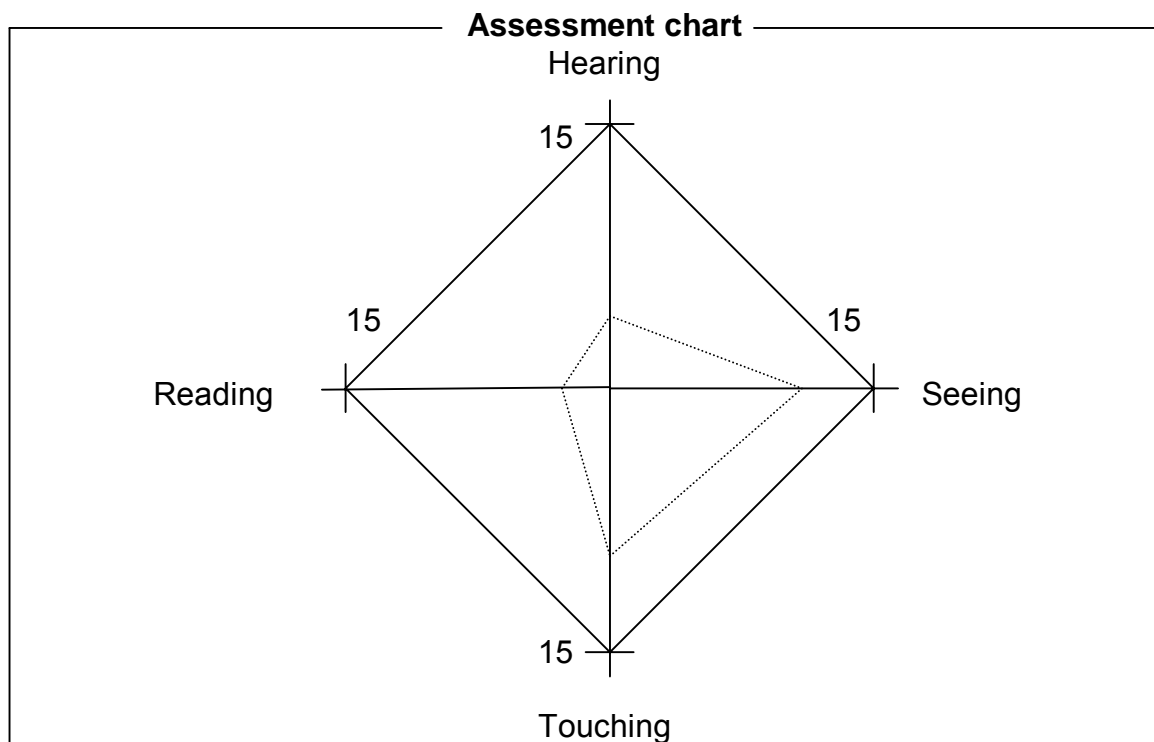
Tree	house	car	cup	key
Airplane	faucet	clock	telephone	bottle
Hat	suitcase	boat	table	book

Finally, day-to-day items are given to participants; they can be held for 2 seconds each and are then passed on to the next participant. After mental arithmetic and time for recall the final assessment is made.

Touching:

Scissors	ruler	paper clip	envelope	eraser
Pencil	ball	coin	sharpener	pocketknife
Rope	stone	spoon	diskette	ring

The results of each exercise are noted in an assessment chart. The diamond with continuous line in the example below shows the result of a person who has remembered all 15 words in each category, which is the maximum result. The diamond with the dotted line shows the result of a person with a preference for seeing and touching while having problems with reading and listening. This person should try to visualize the learning material and put emphasis on graphic presentation. He/she will probably have problems when just listening to lectures or reading textbooks without getting physically involved. The bigger the diamond, the better the memory performance. The more even the diamond stretches to all four sides the more the different input channels are equally good.





Mental arithmetic exercise box				
3×7	$3 : 3$	6×5	2×10	5×5
$2 + 17$	8×5	$11 - 4$	$1 + 6$	$35 - 6$
$9 - 3$	$10 - 7$	$8 : 4$	7×2	$2 : 2$
4×4	$5 : 1$	$17 - 4$	8×7	6×7
$9 + 3$	7×7	$7 + 3$	8×4	$4 - 3$
$15 - 9$	$18 + 2$	$9 : 3$	3×3	4×2

4. Enhancing memory and skills performance

A great part of learning is devoted to memorizing terms, definitions, names, words, dates and other facts. As already explained in unit 1, learning is most successful when both sides of the brain are involved, that is as many senses as possible. Another significant approach includes the systematic and active repetition of the learning material. Instead of just reading a text, a list of words or some historical dates it is much more effective to actively and consciously instill this information in the memory. This can be achieved through written summaries, structuring, marking and reading aloud of new information, talking about it, question and answer games, mind maps etc.

The importance of repetition can be seen in the following charts: Chart 1 shows how much we remember of new information without repeating it. After one day, we already have forgotten half of the new information, and after 14 days we only can recall 10 %, quite a dramatic decline!

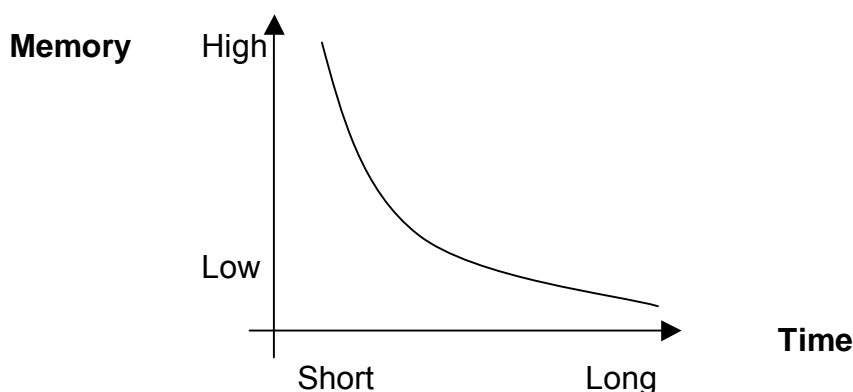


Chart 1



Chart 2 shows how much of the new information we remember after repeating it after one day: a considerable portion of the new information already is deleted after this short period of time. Chart 3 features a repetition of the learning material already during the same day we were exposed to it. Even if we don't repeat it during the following days, we still recall quite a big portion.

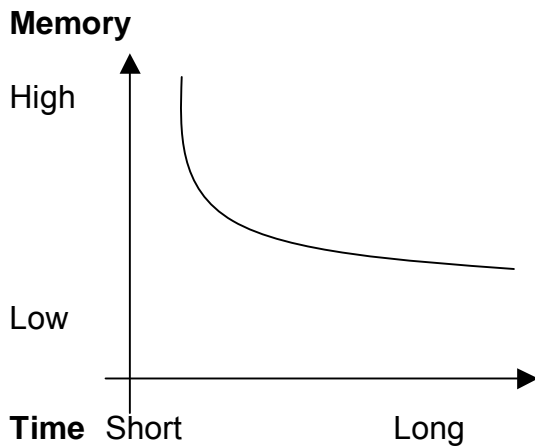


Chart 2

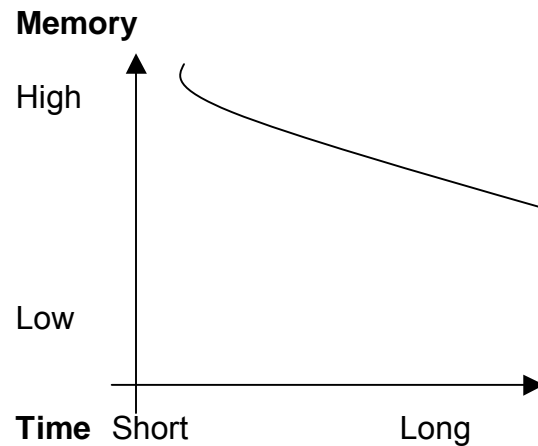
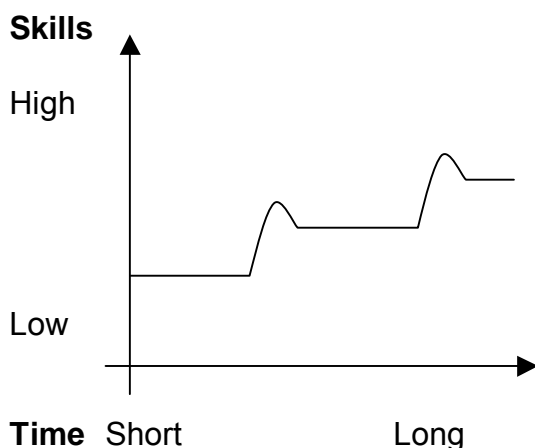


Chart 3

Of course, the result will also depend on the way we repeat – whether we get actively involved in the process or not, whether we repeat systematically or not. There are also other factors influencing the outcome of our efforts. For example, newly learned English words compete with a lot of other information. About ten units of more or less complex news can be remembered per day as an average. If we spend a lot of time in front of television or the computer each day, the newly acquired information will have a hard time to find its way to the long-term-memory. What is being stored there is also decided during night: Sleep stabilizes the content of the memory – but only when the new information has been used during the day. If the day-to-day relation is lacking, the whole learning effort is useless in the long run.



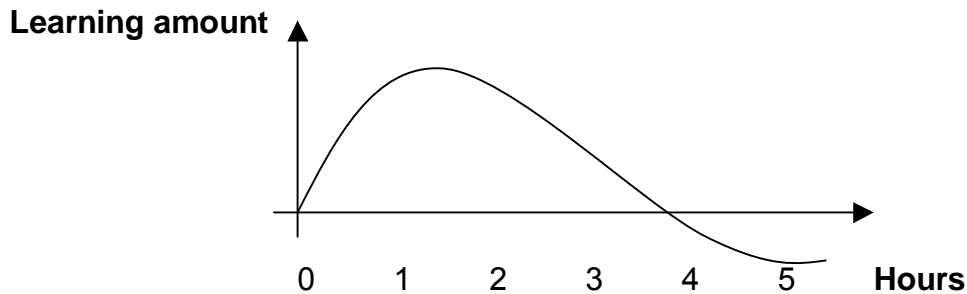
With regard to skills, repetition in the sense of exercising is also crucial for the long-term success. However, this learning curve looks quite different: As shown in the left, it starts at a certain level with a steady base line called a plateau. After continuous exercising, it rises sharply and immediately after drops a little bit: it has reached another plateau on which it continues steadily until there is another sharp rise or 'learning high'.



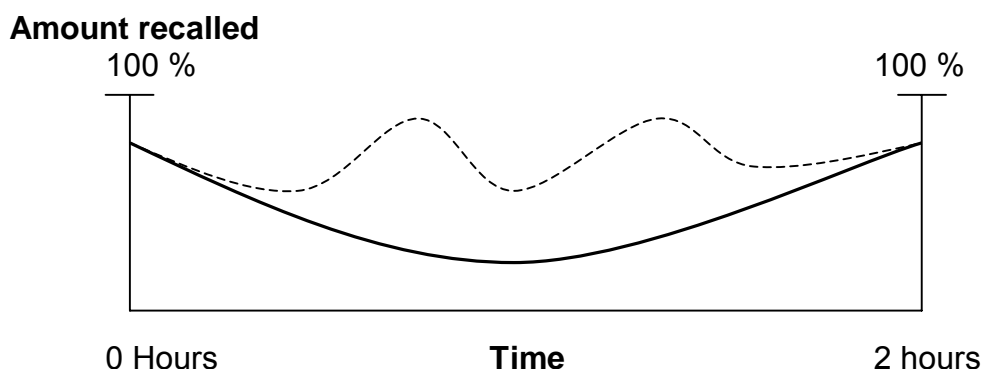
This curve tells us that training is a continuous, ongoing process. We first have to pass through a plateau before we can move on to the next level. The decline after the experienced 'high' is part of this process to stabilize our achievements and is the confirmation that learning takes place. In other words: We have to learn to love the plateau!

Though repetition is crucial for the success of our learning efforts, a lot of learners commit a serious mistake when preparing for an exam: Instead of planning and scheduling their work properly, they wait for the last day and then start repeating all the learning material. They believe they will not forget so much when they repeat it just briefly before the exam. This, however, is quite a wrong assumption.

Since our memory needs some time before it reliably stores new information in a way that it can be recalled later, it is useless to start learning completely new material just one day before an exam. On the contrary, this may cause simply confusion and chaos, which, in return, lead to insecurity, nervousness and lack of concentration. Finally, starting late also means that too much information has to be reviewed. This attempt will lead to learning for hours on end, which will have just the contrary effect: instead of remembering what we learned, we begin to forget it. This is illustrated in the chart below: the longer we learn without a break, the lesser we remember. The result of this unfruitful learning effort is very often confusion paired with self-doubts and exhaustion.



Instead we should start reviewing manageable portions early and regularly. Learning with regular breaks (dotted curve line) keeps the recall high, due to increased effects of primacy and recency: the start and the end of a learning session are more memorable than the middle. Also, during breaks the subconscious processes the new information as well as it relieves physical and mental tension. The amount we recall while learning without breaks is much lesser (continuous line).





5. Planning learning activities

The first step in planning our learning activities is the portioning: Before we start with our homework or preparation for an exam, we divide the material to be learned in manageable units and tasks. These can be written on small pieces of paper and put on a pin-board. Thus, we not only have a clear idea of the work to be undertaken, we can also plan and schedule minor or major breaks between the different units. We can also see how the amount to be learned slowly decreases – it provides us with a sense of achievement!

Portioning

The next important step is the sequencing of our learning: with what to start? In order to get into the proper learning mood, it is recommended to start with an easier assignment. Also, the first 15 minutes are usually spent to get going and concentrated on the task before we reach our full efficiency. So if we have an interesting and promising first job to be done, the more stimulating it is to continue with learning since our self-confidence grows with success, thus increasing the chance that we can also handle difficult assignments.

Easy start

Once successfully started, the performance chart usually stays high for quite some time. Therefore, more difficult tasks are completed during this time, after which we again switch to tackle easier tasks. We may finish with a final complicated assignment, which is easier to be executed with leisure time just waiting around the corner.

Sequencing

For sequencing, variety is an important factor: it prevents monotony thus increasing the percentage of recall. It also makes learning more interesting. For example, similar subjects should not be learned one after the other, like learning languages. Also written and oral exercises should alternate, difficult with easy ones and son on.

Variety

With regard to breaks, shorter and longer intermissions help to keep mentally fit. After 30 minutes, a 5 minutes break is useful for getting up, stretching the body, fetch a drink etc. If we learn for a longer period of time, we should include a longer break of 20 minutes after one to one and a half hour working time. The break should really be used for relaxing, e.g. listening to music, going for a short walk outside or just doing some physical exercises and not for other strenuous activities like watching television or working on the computer. Activities like these would interfere with the learning process and reduce attention, jeopardize the learning success and unnecessarily prolong the working time.

Break-time

To prevent having to learn too much, learning activities need to be properly scheduled. This means to be aware of how we use our available time. If, for example, we always complain about shortage of time, a proper monitoring of all our activities for one week can be very helpful: We can find out whether our time management is effective or whether we are wasting time. Based on these

Scheduling



findings, activities can be properly scheduled – learning as well as leisure. The following statements may give you an idea how you make use of your time.

Tracking down the time thieves



- I talk too frequently and long to my friends on the phone.
- I spend too much time in front of the tv or computer.
- I am dawdling too often and avoid unpleasant tasks.
- Often, I work too grimly; this deprives me of mental fitness and costs me time in the end.
- I have so many hobbies that I have hardly any time left for schoolwork.
- I search far too long for certain items because I do not keep things in order.
- I am distracted too much through visitors and other disruptions.
- I like to listen to music when learning; that way, I cannot keep to the point and need more time.
- Very often, I just start working without any plan, which prevents proper progress.
- I can hardly say No when others try to keep me from working.
- I tend to keep putting off my work, which strains me somehow and paralyzes my work.
- Often, I make things difficult for myself, I brood and can't move on.
- I do too many irrelevant things and am not concentrated on the important tasks.
- Usually, I only work under pressure; as a consequence, I tense up.

The evaluation of this exercise and the detailed monitoring of our activities for one week help us to assess how we spend our time and which are the problem areas. The next step is to introduce proper planning. For this, we use our diary and schedule important activities such as when to start preparing for exams etc. When scheduling, we consider the time of the day for our activities – whether we perform best during morning or afternoon. We also plan days off as a reward or a special treat for good results: We commit to learning, but we also reward ourselves and enjoy the days off!



6. *Preparing for exams*

Planning

As we already said, it is important to start preparing for an exam early enough: last-minute learning can have the contrary effect. Therefore, we have to schedule our exercising and reviewing activities well in advance. Like for learning in general, all rules are also applicable to exam preparation: portioning, sequencing, keeping the learning varied, getting actively involved through talking about it, preparing charts, drawings etc. The more graphic we prepare the learning material and the more we get actively involved, the more we remember. Preparing a codigoro is also a good form of preparation: we don't have to take it with us for the exam; the preparation itself helps us to memorize the most important!

Working under time pressure

Another important preparation step involves working under time pressure. Exams only allow limited working time; we can test to work under time pressure by working through previous exams under a given time limit. We can also pick out particular exercises and set a clock so we know whether we can cope or not. Thus, we not only exercise how to work under time pressure, we also develop a feeling for time.

Staying calm

The morning before the exam we should avoid repeating the learning material since it will increase our tension and nervousness. We also try to stay away from heated discussions among classmates about the exam's topic: all what causes insecurity or stress is of disadvantage!

Clarifying the demands

As soon as we obtain our exam papers, we check all the exercises in order to assess whether we understand what we are asked to do. If we are still unclear what is expected of us despite intensive thinking, we ask the teacher, even though this might not be welcomed. Afterwards, we arrange on the sequence of the tasks and allocate the available time. For the start, we tackle something easy – not necessarily the first exercise – so we have already achieved something, which, in return provides self-confidence and optimism. If we get stuck with a difficult exercise later on, we switch and work on exercises we can solve. Thus, we ensure to collect as many points as possible.

Sticking to the topic

During work we make sure we stick to the topic. Writing too much, not concentrating on the essential or avoiding getting to the point only does more harm than good. It also leads to waste of time, which, as we all know, is scare during an exam.

Rewarding ourselves

When we finally receive our results, we make sure to recognize and reward our successes: It encourages positive emotions about learning, ensures that learning is fun, enjoyable and worth doing again. Although incentives should be given along the way, the end deserves most of the attention. All too often, rewards are overlooked and any success passes unrecognized, never to be repeated.



7. *The learning environment*

The following statements will help us to find out what kind of learning environment is most conducive for us. First, we look into the personal learning atmosphere.

My learning results are best

- When music is played during learning
- When I am not distracted by any kind of noise
- When I am alone in the room
- When someone I like stays with me in the same room
- When I am together with my classmates
- When I am surrounded with strangers (atmosphere of a café)
- When I have eaten before I start learning
- When I can eat or drink during learning
- When I am in a good mood
- When I am angry or frustrated
- When I am looking forward to something nice after I finish learning

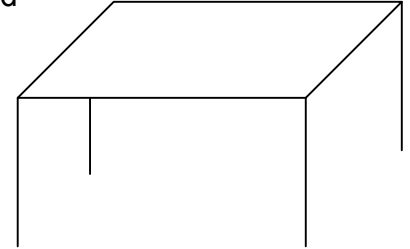
The next set of statements describes the learning atmosphere at school.

- I can follow some teachers very well, with others I have difficulties
- There are teachers I am afraid of
- With these teachers my marks are usually low
- With these teachers my marks are usually high
- I feel inhibited by my classmates or colleagues
- In a certain environment, I can concentrate myself very well, in others not
- I often experience thinking blockades and I do not understand despite repeated explanation

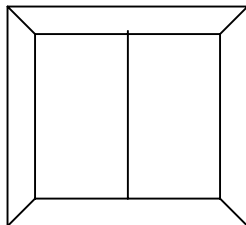
Our answers to these statements make clear what learning conditions are favorable for us and what conditions cause stress or even mental blocks. Though there are individual preferences and dislikes, some general aspects should be considered:



The Workspace should be inviting and encouraging to study. Distractions should be removed while everything needed should be at hand: books, pens, rulers etc. Posters and mind maps on display can help to stimulate the mind and get into the right learning mood.

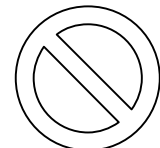


The desk or table should have navel height and as much space as necessary: Beware of cramping! The chair should be comfortable, straight backed and high enough so our feet are flat on the floor and the thighs parallel to the ground. A good posture increases the supply of blood to the brain.



The Working Conditions should allow for proper light – natural light is best, such as sitting next to a window. For artificial light, a standard bulb is better than fluorescent. Since oxygen is essential for the brain to function, the cleaner and fresher the air the better. At breaks, spending time outside in fresh and clean air is most recommendable.

Mind & Body should be in the right condition: While sufficient sleep and regular rest is a must for our brain to function properly, unlimited television viewing and hour-long playing of computer games is a clear no.



Regular exercises help to clear the arteries and provide oxygen for the blood: Our brain uses 25 % of our body's oxygen and blood supply. A healthy, balanced diet also contributes to learning success; too much sugar, starch, caffeine, alcohol and other unnecessary drugs lead to mental dullness.



Energy for learning is released through relaxation. Before starting to learn, we should try to get into a calm and positive mood. Simple relaxing exercises at the start and during break times can help us.

With our eyes closed we

- Sit or stretch out and listen to relaxing music
- Tense and relax each muscle in turn, starting with our feet and working up our body
- Imagine walking down a flight of stairs; after each step, we exhale and say 'I am even more relaxed now'

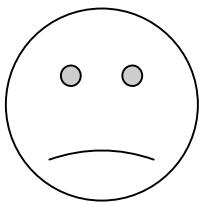


8. Learning difficulties

A common complaint of students is that they spend a lot of time for learning, yet the test result is not satisfactory. Possible reasons for the low success rate can be found in the previous paragraphs on learning strategies; when the suggestions mentioned there are followed over a longer period of time, it surely will show in the results. However, students may need guidance and advice when encountering problems. They may not be aware of the mistakes they are committing when learning. Also, they need to be familiarized with learning methodology during school time so they can make use of it for their own individual learning efforts eventually.

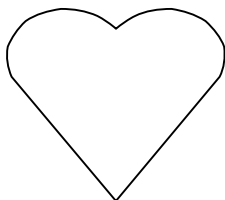
Causes for learning difficulties are of varied nature. Particularly young people may display certain characteristics or behavior that affect their learning success:

Mental sphere:



- Reduced ability to structure when acquiring information
- Reduced ability to abstract and conceptualize
- Limited ability to transfer known facts to new situations
- Restricted imagination
- Restricted perception
- Reduced memory performance
- Reduced ability to concentrate
- Language deficits

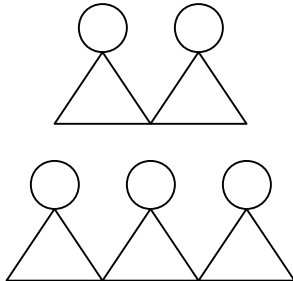
Emotional sphere:



- Lacking emotional stability
- Strong orientation on needs when acting
- Rather passive drift approach than active problem solving and shaping of life
- Tendency for depression or aggression
- Deficiency in acknowledging and expressing own feelings
- Strong fear of failure
- Negative self-image with low self-esteem
- Low staying power, little perseverance
- Aversion against school and school tiredness

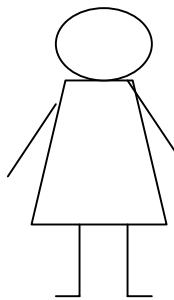


Social sphere:



- Reduced ability and willingness for cooperation
- Difficulties with accepting and coping of social role
- Social behavior ranging between being the clown or being strongly inhibited
- Loner
- Emotional outbursts
- Problems to subject to social rules

Physical sphere:



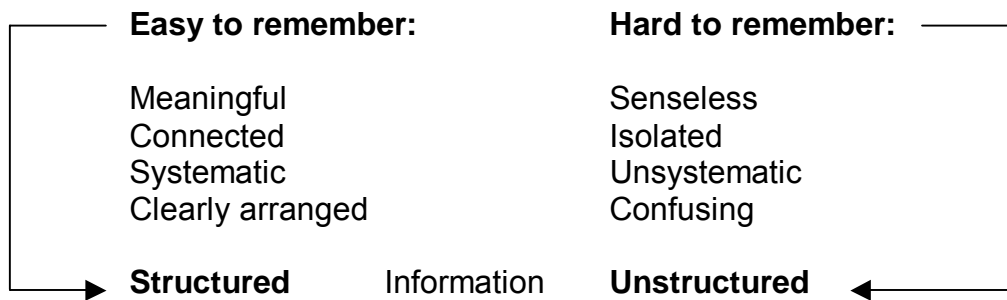
- Frequent delays in physical development such as muscle development, growth, sexual maturity etc.
- Reduced performance with regard to speed, coordination and strength during work proceedings
- Weakness with fine motor skills and therefore with precision
- Poor coordination between muscle activity and perception

9. *Overcoming difficulties*

When comparing research studies on normal young people and young people with learning difficulties, the latter group shows a reduced performance when receiving and processing information. This means these young people have more difficulties than others to receive and process new information in their short-term memory in a way that it can be stored in the long-term memory.

This seems to suggest that they don't have problems in general to store and recall information later on provided that they were able to store it in their long-term memory. Therefore these learners need more time, more repetition and more assistance on how to memorize the learning content, so it will migrate from the short-term to the long-term memory.

Students and trainees can remember sharply outlined and well-structured learning material much better since it also offers a structure to process it in the short-term memory and then store it in the long-term memory.



As teachers and trainers we can enhance the learning process, particularly in skills training, by:

- Counting the working steps with the fingers, thus recalling the sequence of actions
- Formulating What-How-Why questions and answers and asking the trainee to repeat them while he/she tries on his/her own
- Speaking out loud while conducting work: loud thinking along, loud imagining, so the trainee can follow the thinking process
- Creating mnemonics
- Linking learning material to reality of student/trainee
- Developing association patterns
- Drawing a flow chart to visualize a procedure/process

Repetition is crucial for storing new information in the long-term memory. As teachers and trainers, we can encourage students/trainees to enhance the results of review by:

Learning with a partner or in a group

Being in a group among peers, it is much easier to ask questions, which may be considered “stupid questions” in class. Thus the student can ask all the things he/she may be expected to have understood or to know already without losing face. At the same time, the student can help to answer questions of others: We are learning most when we have to explain something to somebody else.

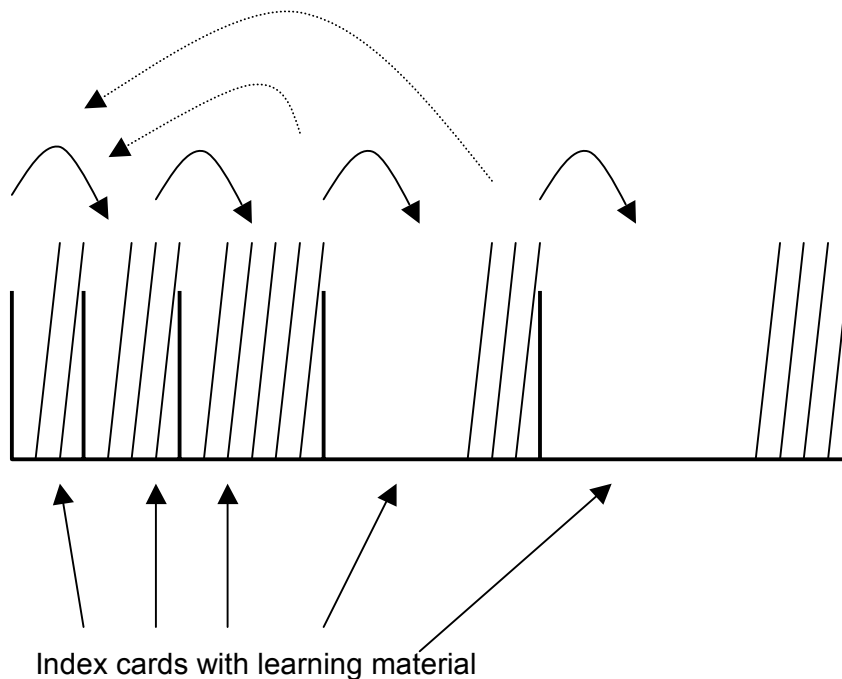
A learning group can be formed part-time to prepare for an exam or as a regular way of learning together – subject related or doing homework in general.

Preparing visual aids

Students should be advised to prepare visual aids like mind maps, charts etc. on their own while learning. It will enhance the understanding of the learning material since it needs to be processed for visualization. At the same time it supports the remembering of information since the learning material is linked with a visual.

Using a learning index-box

A learning index-box is very useful for learning vocabulary or any other material, which has to be repeated for memorizing it well.



All index cards start in the first compartment. When learning and reviewing, index cards we have processed correctly move on to the next compartment until, after five rounds of reviewing, they reach the final compartment. Index cards we have not memorized stay or are transferred back into the first compartment. Each learning session involves all first four compartments until all index cards have reached the fifth compartment. This process can be repeated after some time meaning all index cards go back to the first compartment until we decide to sort out those we really have learned well. Of course, new index cards with new learning material can be added all the time.



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