Chapter 5

Learning:
Further Developing Capabilities

Purposes

Every second of our waking lives is a learning situation. Patterns of neurons (brain cells) in memory areas are undergoing constant formation or reorganization. In each instant, new information and experience (perceptions) are being recorded, or attitudes are being changed, or behavior patterns are being altered, or a problem is being solved, or an insight is occurring to us. There is even evidence that some of these learning processes occur during sleep.

Naturally, some learning situations are more important than others. Importance is a function of our need to recall and use what we have learned. Successful performance and fulfillment in our various roles require that we learn many necessary inputs. From childhood forward, what we learn and how well we learn it underlie all else we are able to do —think, cope with change, respond to the environment, relate with others, and perform tasks. Thus, learning is undoubtedly the most important of all mental activities.

This chapter describes learning, memory, and recall processes. It reviews the major modes and methods through which we learn. In addition, it identifies the major factors that influence learning effectiveness and efficiency. Just as factors that influence thought can be purposefully affected, so too can these factors, because many are the same in both cases.

Chapter 5 describes and defines learning in various terms. In **Part 1** we present principles for (a) improving personal inputs to learning (e.g., motivation, skills, knowledge), and (b) improving or adjusting other personal characteristics and behavior patterns. **Part 1** also presents the rationale for using a systematic approach for acquiring knowledge and experience. The more one appreciates the need to use this approach, the greater will be his or her inclination to use it. In **Part 2** we outline that approach—a system of practices for structuring learning situations and improving one's effectiveness and efficiency in learning situations.

Recommendations

Remember the Preparation Steps:

1. **Awareness – Think what you're doing** and how to do it well
2. **Increase Motivation –** Why is this material important to you?
3. **Seek a conducive learning environment**
4. **Get organized –** get everything you'll need together
5. **Preview the material –** for gist, key words and ideas
6. **Recall and structure Preview impressions**

Again, preview and then read for detail. This is one of the foremost principles of learning. You might also wish to review sections of Appendices A and B that discuss brain activity involved in learning, memory, and recall.

As you read, try to anticipate or even formulate learning principles and the order in which they could be used when you are in an important learning situation.

As in earlier chapters, an abbreviated lecture presentation of this material should largely depend on the depth of students' abilities to understanding the principles, steps, and practices covered in this chapter.

Part 1

ACTIONS to Take Regularly/Continually to Improve or Compensate for Factors That Affect How Well We Learn

Learning capabilities are undoubtedly the most important inputs to successful performance in any role. Through learning processes we acquire knowledge, experience, personal characteristics, specialized skills, and basic mental abilities for learning and using information of all types. The mental abilities include perceiving the world around us, reading, listening, comprehending language, speaking, interpreting other sensory information, recording perceptions (information) in memory, and thinking (reasoning). Without learning we could not solve problems, make decisions, and implement solutions. We could not cope with, adjust to, or otherwise respond purposefully to our environment, thereby satisfying our own needs and drives.

Many learning and memory improvement methods focus on (a) increasing the motivation to learn, and (b) presenting simple techniques or "tricks" for better recording information in memory. Both inputs are important, but they alone do not systematically influence all the important factors involved in learning and memory. In order to maximize our effectiveness and efficiency in learning situations, all the factors must be controlled or influenced—no matter how little or how much each affects learning. Just like any important thinking situations, important learning situations must be treated as systems of variables.

Reviewing What You Already Know

1. What is learning? Memory? Recall?
2. List at least six modes of learning:
   a. d.
   b. e.
   c. f.
3. What are five main factors that influence learning? How does each affect it?
4. How do the following influence learning?
   Mental abilities?
   Values?
   Personality Traits?
   Use of an Approach?
   Time?

General

Learning is the process of recording sensitivities in the brain's memory areas by forming or reorganizing patterns of brain cells in memory. These patterns of cells represent what has been perceived and recorded.

The mental processes involved in this activity can be both conscious and unconscious. You can consciously focus attention on a stimulus, and the resulting sensitivities will be recorded in memory. You can also record stimuli to which you have not paid conscious attention, but which were nonetheless sensed. But, regardless of conscious or unconscious perception, brain activity involved in the recording process occurs without conscious awareness. First, the new sensitivities are compared with sensitivities already recorded in memory. This results in interpretation of what has been sensed (i.e., the sensitivities become meaningful). Then, unconscious processes organize memory area brain cells into patterns that represent the new sensitivities. These patterns will probably be connected with some number of existing patterns—existing patterns representing information that is related in some contextual, space, and/or time manner.

Some learning theorists (behaviorists and others) believe that learning is a matter of establishing a "connection" or "link" between a stimulus and a response. They see the connection as being "conditioned" by repeated association of a stimulus with a given response. For example, when you place food before a dog, its mouth begins to salivate. If you continually ring a bell each time you place food before the dog, the sound of the bell eventually becomes associated with the food (because the smell of food and the sound were related in space and time). Eventually, ringing the bell alone will stimulate the flow of saliva. Thus, a connection (or association) has been formed between stimulus and response. Note also that the "link" represents interconnections between patterns already recorded in various memory areas—i.e., visual, auditory, smell, glandular, and, in other cases, motor (muscular responses) as well.

Several factors are believed to influence the strength of the connections among patterns in memory. Using, practicing, or otherwise repeating the associations strengthens them. Positive, satisfying feedback stimuli strengthen them. The more recent the stimulus, the stronger the interconnections. The greater the intensity of the stimulus, the stronger the connections. Since stimuli are perceived in a space/time sequence, their order also can affect the strength of recorded patterns and their interconnections.

Theories that revolve around these principles imply that learning is a highly "mechanical" process typically found in

of all animals—including humans. These theories and conclusions were derived from experimentation with animals and observation of human behavior.

Psychologists of the Gestalt school believe that learning is more dependent upon past experiences, which provide meaning to new experiences, rather than upon repetition alone. To them, learning is also a matter of insight that results from discovery of relationships among elements of a **total experience** (which the word "gestalt" means). They also see learning as a more conscious and goal-oriented process.

Many of these and other theories are not altogether right or wrong. Some learning, especially of sensory-motor activities such as driving and playing tennis, can be "conditioned" or "habituated." We often learn to make certain responses to certain stimuli. Other learning, especially that which is related to ideational processes such as thought and speech, are undoubtedly a function of information previously recorded in memory. In Appendix C we discuss how both several types of learning occur as the mind develops over time.

Thus, learning is basically a matter of forming and reorganizing patterns of memory area brain cells that represent our experiences in the environment. It is a process which results in measurable changes in behavior. Learning therefore, is behavior adjustment. (Again, if you are interested in more detail, refer to Appendices A, B, and C to review the discussions on learning.)

Remembering something, or recalling it from memory, is a process that can be briefly explained as follows. Basically, your mind automatically "searches" through millions of patterns of neurons in memory areas of the brain for those that represent information that is somehow related to, or associated with, what you are seeing, hearing, or thinking. *For example*: If you were asked to recall the type of car with a top that can go up and down, your mind would search memory for patterns that represent "car," "top," and "up and down." In an instant it would locate patterns of brain cells that represent those three elements. Once these patterns are located, they are instantaneously connected to interpretive areas and you picture and/or hear "convertible" in your mind.

"Why do I forget things" or "Why can't I recall things when I want to" are probably questions for which you would like answers. We will get to these answers shortly, after covering additional foundations.

Factors that Influence Learning and How to Control or Influence Them

Even though many factors are shown in ***Figure 5.1*** on the next page, five main factors are generally recognized as influencing learning the most. For a learning situation to be most effective, they must be consciously controlled—some maximized, some minimized, and some compensated for in various ways. As you read about these and several additional influences, consider how you are personally affected by them. Also, see if you can anticipate ways to learn more effectively and efficiently.

Increasing Awareness of Learning Situations

Becoming consciously aware of a learning situation depends on unconscious levels of the mind signalling the conscious level to "pay attention." This phenomenon occurs because of activity within and between sensory, interpretive, and memory regions of the brain. The brain compares present sensory information with your repertoire (storage in memory) of recorded sensations. When sensations do not compare with recorded information, they are unfamiliar and lack meaningfulness. As a result, the brain signals the conscious mind that something unfamiliar is occurring and that this might be a learning situation. Awareness is also a function of the perceived importance of the sensations. The greater the importance, the more likely these sensations will be selected for conscious awareness, and the more likely that signals to memory mechanisms will activate the recording of the stream of sensations into memory.

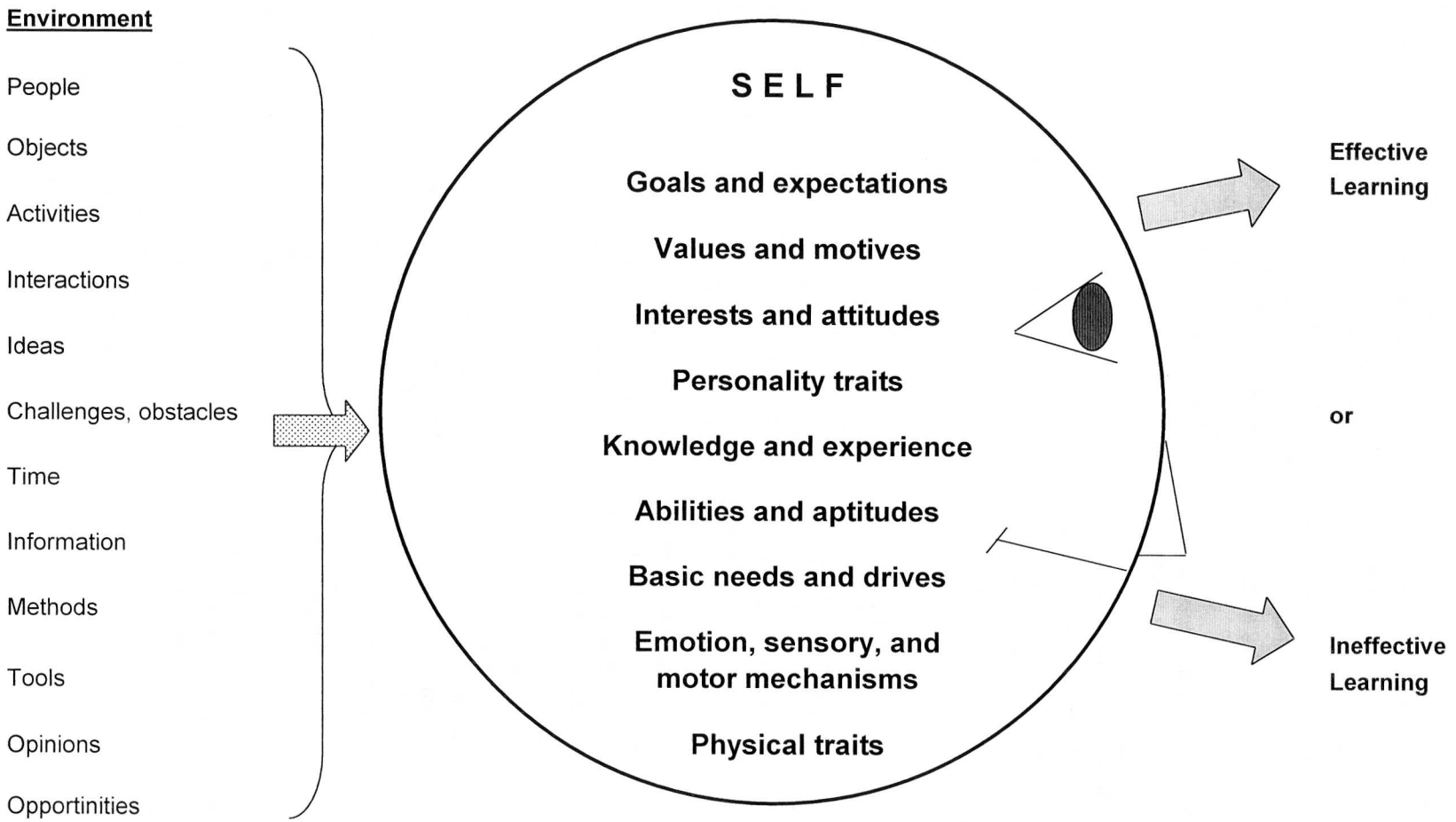
For example: You may have come across words in this book that you did not immediately understand. This could have stopped you for a moment, because there was not adequate information in memory to give them meaning. The new sensations did not successfully compare with recorded sensations (stored information). Thus, the words were unfamiliar. Unfamiliarity signals a learning situation.

ACTION: Formulate Goals and Plans (to Increase Probability of Becoming Aware of Important Learning Situations)

To increase awareness and the strength of the signal to memory mechanisms:

a. identify what you should learn in the short, intermediate, and long term, and write down those topics and abilities so as to better fix them in memory; and

Figure 5.1: Factors that Influence Learning



b. imagine the emotional satisfaction or fulfillment you will experience when you reach the goals that this learning will help you attain.

What you should learn depends on what you should be able to do in order to perform tasks, think, cope, interact with others, and solve problems well enough to reach your goals. For this reason, we advise you to (a) review your goals and plans, and (b) amend your list of special knowledge factors and abilities that you now foresee as requiring improvement or further development. In effect, **you will be goal-orienting awareness and perception**. You will also be making awareness and perception more selective. This will help your mind filter through vast amounts of information and select only important information for your awareness. Thus, making awareness and selective perception more goal-oriented is a means for better coping with information over-load.

There are additional cues that you can imprint in memory to help unconscious levels signal important learning situations. Unfamiliar visual stimuli like a new face, new name, or new word should indicate that you have something to learn that might be useful to you. Certain spoken words or phrases are also cues:

"I'd like you to meet __." "Listen __." "Did you know that __?" "He said __."; "The fact is ___" "Don't you think that __?" "I heard __." "That's not the way to __." "The explanation is ___" — etc.

Also possible cues, emotional reactions such as frustration, fear, guilt, disappointment, and anxiety are the results of negative feedback—feedback indicating that perhaps you should have already learned something, and should do so now. (Remember that negative feedback signal a problem situation. The solution required may be the expansion of your repertoire of knowledge, experience, and behavior.)

Make the following association in memory and constantly reinforce it:

Unfamiliar, Unmeaningful, Unsatisfying Perceptions → **Learning Situation**

Again, awareness that "I am in a learning situation and can make it more effective by ...." enables you to think what you are doing and then do it better.

Also, by recognizing now what is important for you to learn, you will better recognize its importance when an opportunity to learn it knocks. You will then become more motivated to learn it.

Using a Systematic Approach for Structuring Your Own Learning Situations

We have found that many if not most people are relatively unaware of, or at least seldom think about, (a) the factors that influence learning, and (b) their own mental limitations in learning situations. Moreover, very, very few have been taught methods for structuring their own learning situations, maximizing certain factors, minimizing certain factors, and compensating for various mental, behavioral, and environmental limitations. Without knowing and purposefully using the principles, steps, and practices for better learning, people's effectiveness and efficiency in learning situations cannot be maximized.

ACTION: Learn (and Make a Habit of Using) a Systematic Learning Approach

Part 2 describes in detail a systematic, three-phase approach for maximizing how well one learns. Read about it (learn it) to remember it. Then, begin practicing its use until it becomes second nature.

Increasing Knowledge and Experience (and the Meaningfulness of New Material)

Stimuli are interpreted and have meaning when they are compared with information (sensations) already recorded in memory. Thus, the greater our existing repertoire of knowledge and experience, the more existing patterns with which to associate new experience, and the more meaningful the new experience (and information) will be. Also, the greater one's repertoire, the more patterns with which new sensations can be interconnected, and thus, the better they will be recorded and later recalled.

ACTION: Learn — Increase Knowledge and Experience

Based on your goals and plans, make a point of learning the information that you identified as helping you to implement those plans and attain those goals. Read, listen, observe, discuss and think about the knowledge you need. Also make a point of interacting with and experiencing the world around you—the people, places, events, and things that will expand your repertoire of recorded information.

Improving (Further Developing) Learning Abilities

Intelligence

How well you interpret and record new information and experience has a direct correlation with intelligence. In fact, the more intelligent you are, the more existing patterns in memory that your mind will use to make new material more meaningful; and the more interconnections in memory your mind will make among new sensations and recorded sensations. In other words, the more intelligent you are, the more detailed, complex, efficient, and effective your learning processes will tend to be.

Learned Mental Abilities

You may be born with high intelligence potential, but if learned abilities involved in observing, perceiving,, reading, listening, interpreting, reasoning, and recording are not fully developed, your mind cannot work at "full power." These abilities are almost certainly not fully developed in most people. Thus, in terms of learning effectiveness and efficiency, we are all somewhat limited.

Brain Mechanisms

Regardless of intelligence, mental abilities, time, motivation, environment, behavioral characteristics, and other variables, **the mind is still a great simplifier**. In an age when information is exploding and becoming more complex, we are becoming "over-loaded" with information. To compensate for the frustrations of trying to handle so much information, we tend to "cut through the detail," over-simplify, over-generalize, and develop a ***low tolerance for detail***. We also are developing the habit of "learning" something not to remember it, but to at least remember where the information is located if we ever need it. Learning something to recall it when needed is becoming a thing of the past. Furthermore, instead of improving our own learning and memory abilities, we have begun to take another easy way out of processing and handling information. We are devoting billions of dollars to the development of complex information processing, storage, and retrieval systems. Although these are useful and efficient extensions of the mind, increasing dependence on computer systems is beginning to reduce the incentive to improve the very powerful (but limited) system that sits atop our shoulders. Remember, we must expand our repertoire of knowledge, experience, and skills in order to be able to think, cope, respond, and even learn better. Our minds, what is in them, and how we use them are what really count.

ACTION: Further Develop Learning Abilities

We cannot use better abilities to make learning more effective, easier, and quicker unless we further develop them. This is something we must do for ourselves. It is basically a matter of (a) practicing more focused perception of objects and activities, (b) more reading, and (c) more and better problem solving. We already discussed the latter in Chapter 4. We will touch on perception of the environment further in Part 1.

Increasing Motivation

Our level of motivation to learn is the psychological factor that initiates focus of attention, makes us concentrate attention, and helps us to sustain attention and effort during a learning situation. Remember that the limbic system is believed to be the seat of emotional responses, and that it signals other brain areas that a perception (or a stream of sensations) is important to learn (record in memory) and remember. Thus, the greater that the importance of the situation seems to us, the greater our motivation. And the greater our motivation (or positive emotional attitude), the stronger the signal to memory mechanisms. It is believed that that the stronger the signal, the better the experience will be recorded.

ACTION: Formulate Personal Goals and Plans, Identifying What You Will Need to Learn or Develop to Achieve Goals

You are fortunate if you formulated and crystallized personal goals and plans when reading Chapter 3. If not, we strongly recommend that you do so now. Increasing motivation is discussed further in Part 2.

Modes of Learning

We use nine basic modes through which sensations are recorded in representative patterns in memory:

Observation: This is a matter of visual, touch, auditory, or other sensory focus of attention on stimuli. Observing,

reading, listening, and manipulating objects all constitute activities through which sensations will be recorded in representative patterns in memory.

Insight: Through observation and thought (ideation), we interpret, see, or understand a situation in all its aspects. It is a matter of perceiving relationships among present sensations (perceptions) and recorded sensations (perceptions). *For example*: If pattern A is similar or related to pattern C in terms of various characteristics, and if pattern B also shares characteristics with pattern C, then through insight one perceives that A and B are associated because of their common (shared) characteristics with C. (Does this remind you of "class logic" and analyzing problems?)

Imitation: This is a matter of mimicking someone else's behavior. We see what someone is doing and then copy their behavior by, for example, speaking or moving as they did. If you read Appendix C, you will remember that behaving more or less like adults is particularly important for a child's mental and behavioral development.

Trial and Success: Once called "Trial and Error," this is a matter of learning successful behavior while working toward some intended goal. Such behavior involves planning and trying out a possible action, and then finding out if it has been successful or not. It is different from random activity, where a correct response is eventually made by chance. It is by using this mode that we gain experience—that is, we learn what might happen if we do X, Y, Z, possible other actions, or some combination of the alternatives.

Generalization or Concept Formation: A concept is inclusive of particular elements from which it is derived. Definitions, axioms, principles, rules, and laws are the result of insightful generalization from common elements to an all-inclusive concept or frame of reference. If you read *Appendix C*, you may recall the roles of perceptual and reasoning abilities that were discussed. Such ideational processes are instrumental in associating common parts into a conceptual whole.

Project Activity: We also learn by doing—that is, by accomplishing an activity that interests us enough to plan, organize, and acquire the information and/or skills involved. In essence, we are learning through observation, insight, trial and success, and other modes.

Problem Solving: We learn by recognizing a problem situation, gathering facts and analyzing them, reasoning possible solutions, testing solutions, and interacting with the environment as we implement decisions or solutions. During this process, we can be learning by observation, insight, concept formation, mental "trial and success" and activity. The resulting observations, new facts, insights, conclusions, and motor responses are all recorded in memory.

Incidental Learning: In most learning situations, additional information or skills that are **not** the primary objectives are also learned (incidentally). *For example*: Learning how to throw a baseball (back to the pitcher) can occur as we learn how to bat. Also, we can record what we are actually seeing in our field of vision even though we are only focusing attention on one particular thing or activity.

Primary and Concommitant Learning: Primary learning is the specific or intended information or ability that is recorded in memory. Concommitant learning is the incidental learning of such things as self-reliance, the exercise of good judgment, and the ability to plan well.

Methods of Learning

Whole to Part Method: In this case, the general nature of something (i.e., the idea or concept) is learned first, followed by learning the parts of the whole and then relating the parts to the whole. This method's use is most appropriate where there is (a) continuity in the material, or (b) some central idea to which parts and details can be related. Examples are concepts, ideas, or other verbally oriented material. Another example is looking at someone's entire face first, then looking at the parts, and finally relating the parts to the whole face. Thus, the whole to part method is also appropriate for learning visual (spatial) arrangements. The importance of previewing material should be more apparent at this point. The whole to part (and back to whole) method is the reason that we always give you a brief overview of the material you will be covering.

Part to Whole Method: This uses the reverse order. Here, parts are learned first, and then are assembled into the whole. This method is usually most effective for learning non-verbal and non-visual material. It applies best to skills requiring sensory-motor co-ordination—such as playing the piano, playing golf, and swimming. Individual movements are learned first. Next, they are practiced as groups. Finally, they are put together into the whole activity and practiced as such..

Mediating Method: In this method, we learn from the whole to the parts, but accentuate attention to, and practice on, the difficult parts.

Overt Behavior: Using and practicing what has been learned are overt responses that can be reinforced if the behavior is correct or proper, or can be contradicted and corrected if it is not. In other words, any "doing situation" is essentially a test of whether or not material or a skill has been correctly or properly learned.

"Overlearning": Continual practice of skills or use of information strengthens memory by (a) organizing more patterns in memory that represent what has been learned, and (b) re-establishing organized patterns that may have been reorganized by more recently recorded information. Reorganization of previously learned patterns tends to obscure what was learned earlier. In fact, this is a major reason that we tend to forget something and are not able to recall it. We overlearn material by forming more representative patterns initially and then reinforcing them so that the information will be better retained in memory. This is what keeps us from forgetting something and makes recall both easier and more reliable. The more patterns in memory that represent information, the more likely that searching memory will locate the desired pattern. In addition, the more that information is used and practiced, the more interconnections that will be made with other information in memory. As a result, there are more "circuits" which lead to the desired pattern. We overlearn information not just to recognize it when we see or hear it, but to better recall it when we wish to use it.

Improving the Influences of Motive-Attitudinal Traits (Values, Personality Traits, and Interests)

Continuous learning is necessary in all of life's roles. Those who really care about themselves and others will increase their knowledge and experience in a number of areas —such as their job, parenting, interpersonal relations, and technology. Such learning will lead to better performance and greater success in various roles.

Below we describe how your personal characteristics can affect how well you learn. So it is advisable to review your personal inventory and then revise (if necessary) your plans for goal attainment to include improving or adjusting particular characteristics. Keep in mind that the influences of personal characteristics on learning are very similar to their influences on thinking. So, if you did the self-assessment in Chapter 4, reviewing your personal inventory should not take long. After assessing your strengths and weaknesses as they apply to learning, start improving/modifying them as appropriate, especially by performing the activities described in Chapter 8.

ACTION: Adjust Motive-Attitudinal Traits -- or Mediate Their Influences

For various possible reasons, you may not wish to modify these traits. However, at least be aware how various values and personality traits might adversely affect learning, so that you can mediate, or compensate for, their influences when advisable.

Values

If you are relatively high in the theoretical or intellectual value, you are likely to know much about, and are motivated to learn even more about, many areas of knowledge. A predisposition to ask "Why" will also motivate you to search out information and piece it together into a generalization or concept.

If you are relatively high in the economic or practical value, you probably know much about, and are inclined to learn more about, business, finances, and other practical matters.

If you are high in the social or altruistic value, you probably already know much about, and are inclined to learn more about, people and interpersonal relations

If you are relatively high in the religious or spiritual value, you are likely to know and learn much about religious teachings and activities.

If you are relatively high in the political or power value, you probably know much about, and are inclined to learn more about, political institutions, concepts, and activities, and also how to exert influence or authority over others.

If you are relatively high in the aesthetic value, you are likely to know much about, and are motivated to learn more about, the arts and matters associated with them.

Personality Traits

The more adaptable you are (without going to an extreme), the more honestly and objectively you will examine new information—especially when it directly involves you and your relationships or interactions with the environment.

The more conscientious you are (without being too conscientious), the less you will tend to let attitudes adversely color your perceptions of others.

If you are a highly self-sufficient person, you may tend to seek and verify information for yourself, which is functional. However, if you are too self-sufficient, you may not be inclined to avail yourself of others' knowledge and experience when doing so would be advantageous.

The more self-confident you are, the more likely that you will approach learning situations with an "I can and will learn it attitude"—a positive attitude. However, if you are too self-confident, you may not make that added effort

to reinforce the skill or material you have learned to the extent that you can recall it easily when its use would be appropriate.

If you are an overly dominant person, it may be difficult for you to get others' co-operation in collecting information or assisting you to learn necessary material. Also, you may be inclined to assert your own knowledge and beliefs rather than listening to, and learning from, others.

If you are more introverted than extroverted, you may tend to withdraw from the interpersonal or social situations through which you could learn more about people. If you are more extroverted, you are more interested in people and have probably learned more about them and their behavior.

The more emotionally stable you are, the more objective your repertoire of knowledge and experience. Also, you will tend to waste less energy in important learning situations because you are relaxed. Relaxation aids learning and recall. Tension can be a motivator, but it can also reduce concentration.

The more self-controlled (self-disciplined) you are, the more you will concentrate and sustain attention and effort on learning situations—even though your motivation to do so may be relatively low.

Interests, Beliefs, Ethics, Biases, and Other Attitudes

All of these also affect what you will focus attention on and learn. However, they do tend to turn objective observations (i.e., facts) and insights into opinions, conclusions, or assumptions that may or may not be true. This is about the same as saying that we often see things the way *we* want to see them (the way *we* are) rather than the way they really are, or, learn what we *want* to learn rather than what we *need* to learn.

Since values, interests, and other attitudes reflect your needs and drives, they affect your motivation to concentrate your attention on information that may be important to you. Also remember that your repertoire tends to be greater in those areas that are already important to you. Therefore, values and other motive-attutdinal traits affect not only motivation, but also the meaningfulness of material.

Stop for a moment to consider how your values, personality trairs, interests, and attitudes affect both your desire and ability to learn. What are the implications for you?

Physiological Factors

All of our repertoire of knowledge, experience, and behavioral responses is based upon sensory perception. If sensory apparatus or brain areas are impaired, learning is impaired. Thus, age, fatigue, time of day, atmospheric conditions, defects in sense organs, anomalies in the brain, and drugs such as alcohol can all adversely affect learning effectiveness and efficiency.

Consider what you might do to deal with any negative influences on your learning situations.

Environment

No one learns anything in a vacuum. The more contact we have with many people, places, objects, concepts, and ideas (all involving stimuli), the greater will be the extent and depth of our repertoire. We want to maximize contact with the environment. On the other hand, once we are in a learning situation, environmental stimuli can distract our focus of attention. Interruptions of concentration break up the space/time continuity with which perceptions are being recorded in memory. When our train of thought becomes broken, it must be regained in order to continue recording the stream of perceptions most effectively. We will better recall this information if each sensation is directly related in space and time to the sensations that immediately preceded and followed it.

Consider what you might do to deal with any environmental intrusions on your learning situations.

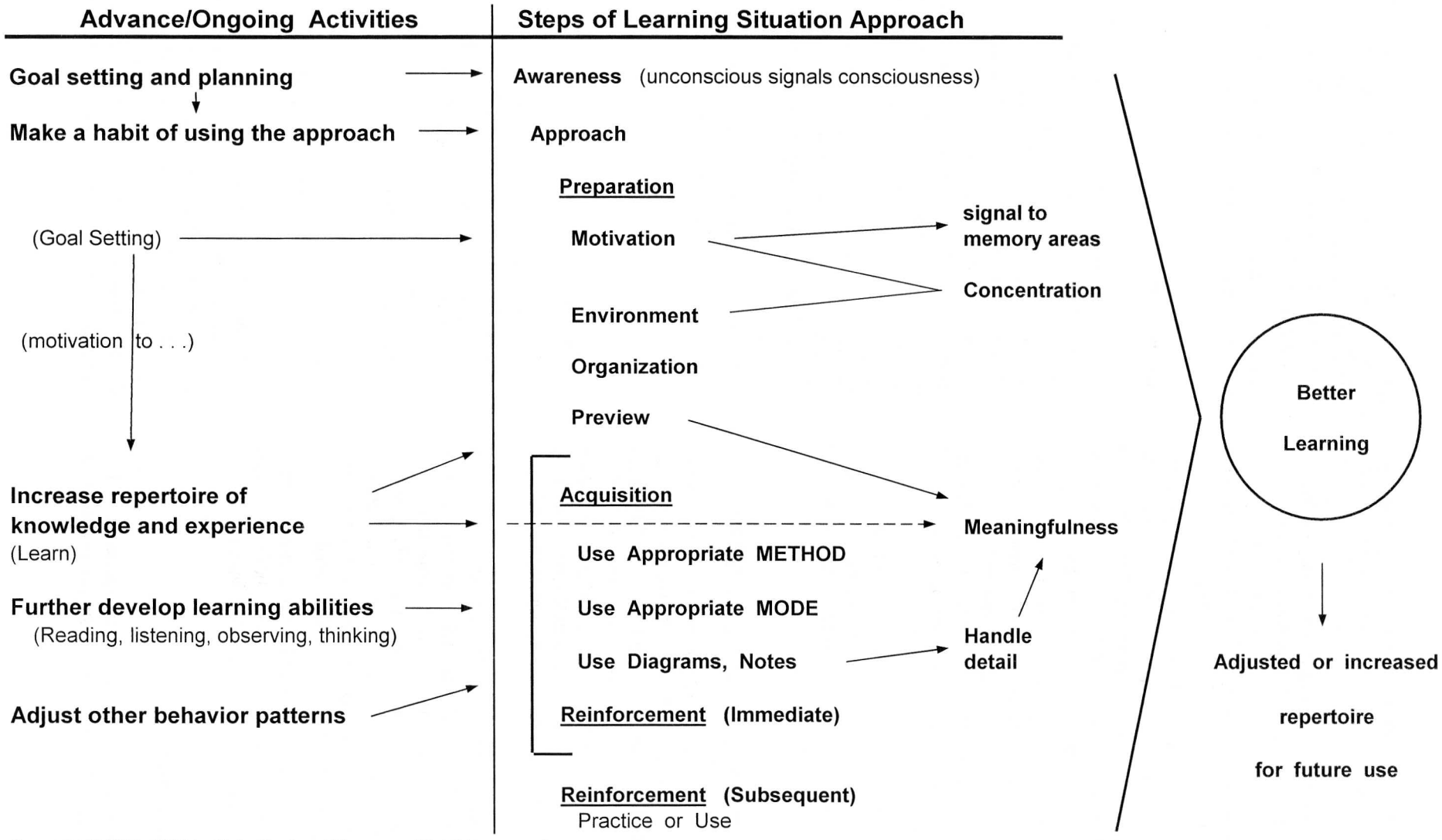
Time

There is so much information we could learn that would be of great value to us. However, there is just not enough time to keep abreast of the proliferation of general and specialized knowledge available. But we can use what time we do have to best advantage if we are motivated, know how to learn more effectively and efficiently, and know what we need and want to learn. Time spent in learning is better spent if it is goal-oriented.

Summary of Part 1

Because we are systems of many specific characteristics, including abilities, needs and drives, values, personality traits, and knowledge, all of these factors influence what we will learn and how well we will learn it. Many of these factors can be considered human limitations. Since SELF is also a system operating within the environment, there can also be external limitations to effective, efficient learning.

Figure 5.2: ACTIONS for Enhancing Personal Factors That Influence Learning



If we add all of the influences (potential limitations) shown in ***Figure 5.1*** on page 5-4, it is little wonder that most people do not—and can not—maximize their effectiveness and efficiency in learning situations.

However, just as in problem solving, all of these factors can be positively influenced both consciously and purposefully to some extent.

The Advance/Ongoing ACTIONS described above are summarized in ***Figure 5.2***. By accomplishing them you give yourself a valuable present: time. Once you have the time and increased motivation to learn, and have identified what you will need to know, you can begin to learn the knowledge and abilities necessary to be what you want to be and go where you want to go in life. You will also have the knowledge and abilities to cope better, perform better, relate better, plan better, solve problems better, make decisions better, and learn better. You might start to minimize one of your greatest limitations by increasing your store of knowledge and experience. This will establish more patterns in memory with which subsequently new information can be associated and interconnected, thereby also making future learning more meaningful and recallable.

Do you now appreciate more than ever the exercises that you already completed in earlier chapters? Have you begun to anticipate how all of these techniques can be integrated into an overall system? You might reflect on these questions a moment before going on.

Part 2

A Systematic Learning Approach (for Structuring Your Learning Situations and Dealing with Influential Factors)

This second part describe principles, steps, and practices for significantly improving and even maximizing the following: (a) awareness of learning situations; (b) motivation; (c) the use of appropriate methods and modes of learning; (d) the effects of functional values, personality traits, and interests; and (e) the development of learning abilities. There are also means for minimizing the limiting effects of (a) time, (b) the environment, (c) dysfunctional levels of motive-attitudinal traits (values, personality traits, and interests), and (d) inferior approaches.

Purposes

The first purpose of Part 2 is to translate the discussion in Part 1 into principles, steps, rules, and practices, each responsible for influencing one or more factors involved in learning.

Because principles and rules cannot all be used simultaneously, a second purpose is to present a suggested order of phases and steps for using applying each principle or rule at the appropriate point in the learning process. In order to do this, the learning situation will be segmented into four basic phases: **P**reparation, **A**cquisition, Immediate **R**einforcement, and Subsequent **R**einforcement. The steps or principles relating to these phases are designed to structure the learning process, channel abilities, and compensate for potential limitations.

The third purpose is to discuss each phase, step, or principle in enough detail to be understood and appreciated. As in the problem-solving chapter, this enables you to identify in specific terms what you are doing right, and why, and what you could be doing better, and how. By doing so, you can more effectively think what you are doing in a learning situation and how to do it better.

Recommendations

As before, take these preparation Steps:

1. **Awareness – Think what you're doing** and how to do it well
2. **Increase Motivation –** Why is this material important to you?
3. **Seek a conducive learning environment**
4. **Get organized –** get everything you'll need together
5. **Preview the material –** for gist, key words and ideas
6. **Recall and structure Preview impressions**

As you read, apply those principles of learning with which you are already familiar. Make notes to yourself whenever appropriate, especially concerning those principles that you do not now use habitually. These will be the ones you will want to use and practice.

After completing the chapter, mull it over, let it "sink in," and then use what you have learned for about a week before going on to the next chapter.

There are no formats or exercises to complete in this chapter. Therefore, your immediate use and reinforcement of this systematic approach is highly recommended.

Reviewing What You Already Know

1. Being better able to recall information from memory is a function of two fundamental activities—learning the material correctly and well the first time, and. . . .
   _____ .
2. Once you are in an important learning situation, what five preparatory steps should you take to improve learning effectiveness—even before actually reading, observing, or listening?
   a.
   b.
   c.
   d.
   e.
3. In which phase of the learning situation should you actually use the most appropriate mode of learning?
4. What types of things are better learned from "whole to part?"
5. What types of things are better learned from "part to whole?"
6. In what ways can the meaningfulness of material be increased?
   a.
   b.
   c.
7. List at least three principles for immediately reinforcing what has been initially recorded in memory.
   a.
   b.
   c.
8. Subsequent to the initial learning situation, which method(s) of learning can be used to improve retention and recall?
9. If information or skills have not been learned correctly the first time, what could be the adverse consequences?
10. Why do you want to be able to learn better and improve memory?

General

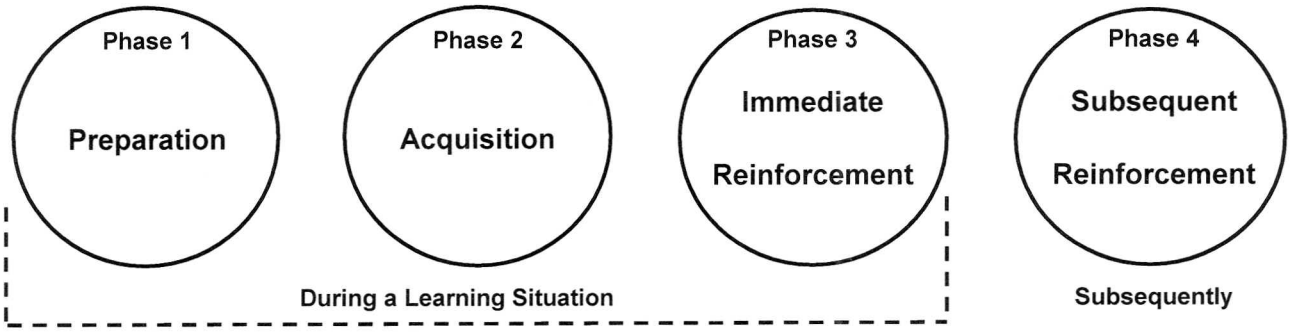
Teachers, professors, and instructors use various principles and concepts to motivate learning and to structure our formal learning situations. Unfortunately, few explicitly teach us and practice us in how to do this for ourselves. This is party why most of us have not learned how to learn better. It is also partly the reason why most of us have acquired some bad learning habits and possess underdeveloped learning abilities. Unfortunately, for the better part of our lives there are no teachers or professors around to motivate us and to structure our learning experiences for us. Therefore, it is advisable that we learn how to do so for ourselves. The question is, "How do we go about it?"

The following pages describe a systematic approach for improving learning. All the factors mentioned in Part 1 cannot be influenced simultaneously, so we must find a way to control them in some logical and effective sequence of steps. Given Part 1, you are probably thinking about the advance/ongoing ACTIONS to take as soon as possible—before too many more important learning situations occur. But then, once you are actually in a learning situation, you should stop to think about breaking it down conceptually into three basic phases: **Preparation**, actual **Acquisition** (and assimilation) of what you are learning, and **Reinforcement** of the patterns you recorded in memory—or **PAR**. [If you are a student, or perhaps a golfer, you might remember this mnemonic device as being "PAR for the course."] These are the main parts of the whole learning approach. Essentially, the use of these phases and the their specific steps—and the related principles behind them—enhance how well you learn something initially and then reinforce it. Initial learning and reinforcement underlie how well you will retain and later remember (recall) what you know when you need or want to remember it.

As you read Part 2, we recommend that you mark those steps, concepts, or principles that you do not presently use. Those will be the ones that you will want to practice and make a habit of using.

The methods we are about to discuss can be used in any learning situation, including situations involving formal study. Because formal study situations can be experienced by most readers, specific study habits are included within the framework of this approach. Students should pay particular attention to these points. However, they are points that everyone should keep in mind.

Figure 5.3: Basic Phases of a Systematic Approach to Learning



PHASE I: Preparation

Step 1: Awareness / Think What You're Doing — and How to Do It Better

If you actually performed the five recommended ACTIONS in Part 1, you will have programmed your mind to make you more aware of important learning situations. When you are aware of important, unfamiliar, somewhat unmeaningful, or negative feedback stimuli, it should immediately cue you to say to yourself: "I am in an important learning situation and will consciously manage the factors and processes involved. I am going to use my improved abilities and accomplish the three systematic phases (and their steps): **P**reparation, **A**cquisition, and Immediate **R**einforcement. I am going to think what I'm doing—and do it well."

Step 2: Increase Motivation

Motivation is one of the five main factors that influence how well you learn something and how well you will be able to retain and recall it. You want to increase this factor at the beginning of a learning situation—so that you will initiate the learning process and actually use the systematic approach.

The key here is to identify the goals that this learning situation will help you to attain. Recognizing goals or purposes gives you an insight into the material's importance to you. Having accomplished Part 1 ACTIONS helps you to recall why this learning situation may be important to you. This has the added advantage of helping you to cope with "information overload" by not bothering with trivia.

Recognizing the importance of the material increases your interest in and desire to learn it. Desire and interest motivate you to initiate, concentrate, and sustain attention and effort. Sustained concentration is one of the most important results of increased motivation. If you do not pay undivided attention to what is being learned, you will not learn it as effectively, efficiently, and easily as possible. Concentration also helps you override the limiting effects of distracting stimuli that interfere with learning processes. Another important result of increased motivation (desire and interest) is the increased strength of the limbic system's signal to mechanisms involved in recording information in memory. You can further increase the strength of this signal by imagining how you will feel once the present learning situation has helped you to reach your goals. This actually increases your emotional involvement in the learning situation, and since emotion mechanisms send the signal, you are heightening their activity.

Motive strength is also increased by the knowledge that you have actually sharpened your learning abilities, and can learn more effectively quickly, and easily.

Step 3: Seek a Conducive Environment

If possible, choose appropriate surroundings in which to learn. If, for example, you wish to observe people or activities in order to learn more about them, choose surroundings that will be rich in such stimuli. On the other hand, when serious study and thought are involved, choose surroundings that are relaxed and as devoid of distracting stimuli as possible. Diverted attention or interruption of concentration will lower the efficiency of the processes involved in perception, interpretation, and the storage of information in memory areas.

Step 4: Get Organized

Get together the books, computer, audio-visual aids, note paper, and other items that will be useful. You want them readily available so that you won't interrupt your concentration by having to get them.

Also, use this step to evaluate your priorities. Compare the importance and immediacy of the situation with other possible learning or thinking activities facing you. Then focus attention on what is most important.

If concentrated study or practice of an ability for more than a short period of time is involved, then plan your time. Set up a study schedule: what you will study, when, and for how long. Experts recommend that a schedule include class time, work time, eating, sleeping, and recreation. It helps organize your time, reinforces your commitment to study times, and holds you to a plan.

Set aside a block of time during which you will be least likely to be distracted or interrupted. Schedule recreation for later, or get it out of the way first if you must. Better yet, you might use recreation to reward yourself for completing the learning situation.

Step 5: Preview the Material

For verbally-oriented material such as books or lectures, read the speaker's program, or read the book's table of contents, preface or introduction, chapter sub-headings, topic sentences, and italicized/highlighted/underlined passages. Familiarize yourself with the vocabulary. Acquaint yourself with the general concepts, principles, or ideas being presented. For motor-oriented learning, acquaint yourself with the basic movements involved. Previewing the material in these ways has many advantages:

A. Meaningfulness - Previewing helps you to form a general framework or structure (the whole) into which more detailed information (the parts) can be fitted together and be better understood. It enables more effective interpretation of new material and increases your insight concerning the relationships between the parts and the whole. It gives you an advanced clue as to whether or not material covered early must be learned well so that material covered later will be better comprehended. Also, it gives you a "map" for understanding where the presentation is going—and why.

   As you preview the gist of the presentation, these sensations cue your recall of existing knowledge and experience. This gives you an idea of just how meaningful the material is going to be to you. Thus, if you are encountering something for the first time, you know that you must particularly apply yourself to making it as meaningful as possible. One way is to clarify your own ideas and information regarding the subject. On the other hand, if you recognize that your knowledge is fairly extensive compared to the material, you will be more aware that (a) what you already know will be further reinforced, and (b) you can expect to encounter additional insights or ideas.

   This again points out the fact that your present knowledge determines to a very great extent how meaningful new information will be. Previewing enables you to consider how existing patterns in memory might be reorganized. This point is discussed more fully later.

B. Motivation - Previewing also enables you to further determine the purposes for which you will be learning and the importance of the material to you. For example, if you were to simply look at a book's cover, how would you know for certain whether or not the contents would be useful (important) to you? You wouldn't, because "You can't judge a book by its cover." Therefore, if previewing indicates that the material is more important to you than you first imagined, motivation will be increased.

C. Mode of Learning - Previewing also helps you determine the mode that will be most appropriate in the learning situation. For example, if learning will be a matter of observation, you must make a point of focusing the appropriate senses on the object, sound, or activity. If learning will be a matter of insight, generalization or concept formation, you know that you must more consciously relate ideas, objects, or activities to each other on the basis of common elements or shared characteristics. If learning will be a matter of problem solving, you know that you must remember to use the approach outlined in Chapter 4 for getting the best results. If learning will be a matter of trial and success, you know that you must first plan your responses and then try them. If you will be learning a motor activity, you know that you may be imitating, using trial and success, or doing project activity in order to learn the coordination of sensory-motor abilities involved. In addition, previewing also helps you to recognize the incidental learning that may occur. Once you have determined which mode(s) of learning you will be using, you can make a conscious effort to actually use them.

D. Method of Learning - During this step you can also better determine which method(s) should be used. If what you are about to learn is idea- or concept-oriented, you know that you should first focus on the whole and

next the parts, and then relate the parts to each other and back to the whole. If you are going to be learning a motor activity such as a golf swing or a swimming stroke, you know that you should first practice separate parts (movements), next practice combinations of parts, and then put them all together into the whole activity. However, if some parts of a whole idea, concept, or activity are more difficult to learn than others, you know that you should use the mediating method and place greater emphasis on learning the difficult parts.

In addition, you should always determine whether or not what you are learning is important enough to be "overlearned," so that it can be later recalled and not just recognized. The major diagrams and tables in this book are examples of material that should be overlearned. It is not enough for you to simply understand and recognize them. Unless they are "memorized," you may not be able to recall them when their use would be beneficial.

E. Previewing also enables you to consider the structure and mode of the presentation of the material. Is the material presented in some logical sequence? If not, you will have to make a special effort to structure it in some manner that is meaningful to you. Is the material presented visually, verbally, or both? If verbally (speech or in print), then you can make it more visual by diagramming or modeling the concepts or ideas. The more sensory modes you use, the better—as long as they do not compete for your attention at the same time.

Step 6: Recall and Structure Previewed Perceptions

Recall and structure in your mind the initial impressions you absorbed as you previewed the material. Fix them in memory. This will make the detail you are about to learn more meaningful.

Remember that, as you learn the new material, you will be reorganizing existing patterns in memory. By recognizing that, you also have an opportunity to fix in your mind what you already know. This reinforces present knowledge so that it will not be "overwritten" or "obscured" during reorganization.

The six preparatory steps are easy to learn and very easy to use. Doing them takes only a few minutes—time which will actually save you much more time and make learning much more effective. Basically, they make you think about what you are doing and how to do it better. There is nothing magic about these steps, but they do greatly increase how well you learn something and remember it.

Please notice that **the first five steps are the same as those used in Chapter 4's systematic approach to problem solving**. If you use these steps regularly in both types of situations, it will take no time at all for their use to become second nature (become a habit).

Review these preparatory steps once more to help you fix them in memory.

Phase I: Preparation

Step 1: Awareness / **Think What You're Doing**
Step 2: Increase **motivation**
Step 3: Seek a **conducive environment**
Step 4: Get **organized**
Step 5: **Preview** the Material (meaningfulness, motivation, method, mode, and presentation)
Step 6: **Recall and structure** previewed perceptions (reinforce present patterns)

PHASE 2: Acquisition

It is during the acquisition phase that you actually use whichever mode(s) of learning is/are appropriate for the type of learning situation involved. Again, these modes include:

Observation (reading, listening, touching, etc.)
Insight
Imitation
Project Activity
Trial and Success
Generalization or Concept Formation
Problem Solving

Rule 1: Consciously Focus Attention

For objects, faces, activities, and other spatial arrangements, observe, don't just see. Define or describe in your mind the characteristics you observe. Ask yourself how these details and characteristics relate to each other. Learning, retention in memory, and later recall are all enhanced if you will consciously direct your attention first to the whole object (or other spatial arrangement) and next to the parts, and then interrelate the parts to each other and back to the whole.

For spoken or written material, listen or read for whole ideas, concepts, or the gist of point being made—not just for minute facts. Look for key words or phrases that will help you recall main ideas. Relate new concepts, words, ideas or other verbal constructs to what you already know.

Relate elements of these constructs to each other and to the whole or central idea.

For a motor (muscular) activity, observe the proper sequence of movements and then imitate them. Also, you can observe what must be done, and then plan movements and carry them out. In either case, you can monitor the correctness of your movements and adjust them accordingly (by paying attention to visual and motor feedback). Control your movements initially to condition the sensory-motor patterns involved. Get the "feel" of the activity. Practice the movement of small muscle groups first, then graduate to putting all of these movements together. Use observation, imitation, trial and success, and part to whole learning.

Rule 2: Keep an Open Mind

Try not to let opinions, conclusions, attitudes, biases, prejudices, and emotions obscure rational perception of what you read or hear. *For example*:

Don't be overly critical of an author's or speaker's delivery or style of presentation. That person may not be the best writer or speaker, but she may have something important to say.

Try not to overly react to emotional words or ideas that you don't like or don't agree with. If you do, you may "tune out" what is being said and miss something important.

Don't avoid listening to or reading something you don't fully comprehend. Follow along so that you will know what you must clarify later.

An open mind is like a sponge. Keep it open and absorb useful knowledge.

Rule 3: Use Recommended Study Habits

If the learning situation involves concentrated study, the following points should be kept in mind:

A. Do not proceed to subsequent material if something is not understood, seems vague, or cannot be comprehended within the context of material immediately surrounding it. Make a special effort to work it out in your mind. Reread the material if you must in order to increase comprehension. You may have to know this material in order to comprehend subsequent material.

B. Experts also recommend that you mix study of verbal and non-verbal material, alternating from one to the other—e.g., math - literature - science - history. If there is a particular course that requires additional "mulling over," study it last. Your mind will tend to keep working on it—even unconsciously.

C. Take occasional breaks at intervals of 30 (or 50) minutes. Research has shown that concentrated study for longer periods can be relatively unproductive. The mind needs time to process what you are learning, especially if it is completely new to you. Also, it is better to distribute learning activity over time. 30 minutes twice a day for 6 days is better than 2 hours once a day for 3 days. Of course, this is not always possible. However, the basic idea is to give your mind time to process the information and let it "sink in." That is why we recommend that you mull over each chapter and use the principles, steps, and practices for about a week before going on to the next chapter.

D. It is usually recommended that a (college level) student spend at least two hours in study outside of class for every hour in class. Good outside preparation makes class work much more meaningful and understandable. Furthermore, representative patterns in memory are multiplied and strengthened through repetition.

Let us briefly review the general rules of Phase 2 (Acquisition):

Rule 1: **Focus Attention**
Rule 2: **Keep an Open Mind**
Rule 3: **Use Recommended Study Habits**

PHASE 3: Simultaneous or Immediate Reinforcement

You have already consciously controlled or influenced the effects of motivation, meaningfulness of material, the environment, and mode of learning. The following principles also help to make material more meaningful and to reinforce the formation and reorganization of patterns in memory. These principles are not arranged in a step by step sequence, because their use depends upon the nature of the material and one's need to use them. Phase 3 principles can also be used as considered appropriate during the initial acquisition of material. However, their use should not interfere with one's concentration. In other words, you should acquire, reinforce, acquire, reinforce, etc.

Principle 1: Use Notes and Diagrams
(for Multiple Sensory Perception)

Some non-visual material such as verbally expressed ideas and concepts (spoken or written) are difficult to envi-

sion mentally. Verbal ideation (hearing and comprehending) tends to be less lucid than visual ideation (seeing and comprehending). Thus, it is more difficult to relate the elements or parts of a verbal idea or concept to the whole construct, or to relate several ideas.

Diagrams: Diagrams, models, and flow charts (which depict a sequence of activities) are visual constructs made up of lines, boxes, circles, words, arrows, etc. They can be drawn to visually represent what has been expressed verbally or in print. They help to (a) visualize a verbally- oriented construct in its entirety, (b) think about it, (c) visualize all the parts or elements, and (d) visually relate the parts to each other and the whole. They are "conceptual frameworks" that also help you cope with information overload by enabling you to relate many bits of information into a comprehensible whole. Moreover, they enable you to relate new information with information already in memory. In fact, diagramming cues your recall of information presently stored in memory—information that should be associated more consciously with the new information. By diagramming new and known information, you organize your thoughts and better relate them. This often results in new insights. All of this activity makes material more meaningful, and it records the information better in memory.

Notes: Taking notes also helps make material more meaningful. It requires that you pick out and write down the main ideas. It also requires recording concise statements concerning whole ideas, their elements, and/or substantiating evidence. Thus, note-taking encourages you to analyze the material, structure it in your mind, and then outline your thoughts and insights. Just as in the case of diagramming, this activity helps you cope with details and complexities.

Both diagramming and note-taking are examples of using multiple sensory perception. You perceive material through more than one sensory mode, and you record the same information in more than one area of memory. *For example*: As you listen to a speaker, take notes, and draw diagrams, you are forming (a) patterns of neurons representing verbally-expressed ideas in auditory memory areas, and (b) patterns of neurons representing the notes and diagrams, which correspond to what was said, in visual areas of memory. The same thing happens when you make ideas in printed material more visual. Patterns are formed in both visual and auditory areas of memory, all representing the same information. Actually, you are perceiving spoken or printed words in auditory or visual modes initially, and then are transcribing your impressions on paper so that they can be perceived again in more "pictorial" form (in the case of diagrams). Spatial patterns are generally more meaningful and readily recalled than verbal arrangements.

Multiple sensory perception enhances retention and subsequent recall of information for two basic reasons:

First, your own thoughts are not necessarily recorded well in long-term memory—unless they are written down so that they can be perceived through sensory organs—your eyes. Remember, researchers found that we do not record well in memory what we think, what we say, and periods of skilled activity.

Second, you are recording the same information in more representative patterns in memory areas. This is a form of repetition, which reinforces memory. As you later try to recall the information, there are more chances that memory search will channel into the desired representative pattern(s).

You may be saying to yourself that recitation is another means of forming more patterns in memory. But again, we do not record well what we think or say. So the real value of reciting what has been learned lies in the fact that **speech is overt behavior, which can either be reinforced or contradicted and corrected by others**.

We all know the usefulness of notes and diagrams when we wish to review what we have learned later. However, don't become too dependent on these devices for recording information for future use. If you do, you will be less inclined to learn the material really well the first time you process it.

We must add one further qualification to this discussion. Don't let taking notes and making diagrams distract your attention from perceiving what is being read, seen, or heard. This is especially necessary if you are listening to a speech or lecture. Whereas you can always reread printed material, you usually cannot hear a speaker a second time if you have missed something he or she said. The first rule is to **pay attention**. Then, make notes and diagrams as soon as it is opportune.

Principle 2: "Mechanical Aids" (Mnemonic Devices)

(pronounced "ne•mon′ ic")

Not all material is meaningful in itself, but it can be made more meaningful by consciously associating it with something that is meaningful to you. *Examples*: The lines on the musical staff (E,G,B,D and F) can be better recorded in memory and later recalled by associating them with "Every Good Boy Does Fine." The same applies to the spaces (F,A,C,E) or "face." Months with 30 days are better learned and recalled using "Thirty days hath September, April, June, and November..." Your own similar devices are usually most effective, because they mean more to you. We

have used mnemonic devices several times in this book—**DRAFTS** and **PAR**. Remembering these mnemonic devices should help you remember the basic phases of problem-solving and learning situations.

Other aids are similar to these devices, although they are rooted in other factors that we have discussed. Objects listed in a given order can be better recorded and recalled if you use "association cues." *Examples*: To remember items on a shopping list, associate the first item with the second (e.g., fish and milk) by creating in your "mind's eye" the most ridiculous image of the two that you can—e.g., a fish milking a cow, or a cow fishing. Next, associate the second and third items (e.g., milk and eggs) in the same manner—e.g., a cow sitting in a henhouse hatching eggs. Associate each item to the next item in this fashion. Keep your mental images simple, exaggerated, showing some kind of action, and out of proportion. Try this device. It not only works, but it's even fun to use.

For someone's name, first make sure you heard it correctly (or at all) when being introduced. If you didn't, ask for it to be repeated. Then repeat it to yourself and say it to the person—the more times the better. Also, look at his or her face as a whole, then at the parts. Pick out an unusual or outstanding feature. Then, as you did in the above examples, form a ridiculous association between the name and the feature. For instance, Mr. Taylor has deep wrinkles at the corners of his eyes, so imagine a tailor sewing them up with needle and thread.

To remember a sequence of numbers such as a telephone number, you can often make words out of the letters that appear with the numbers on the telephone dial. Thus, the number 842-8679 would be "vic-tory."

Principle 3: Conscious Involvement and Evaluation

An important rule in learning is not to be complacent. Instead, the more you are involved in what you are seeing, reading, hearing, or doing, the better you will learn. Deeper involvement stems from your evaluation of the material. So, first read to get the main ideas, and then ask yourself these questions:

A. Is this a theory, fact, opinion, conclusion, or assumption?
B. What is the author or speaker trying to influence in me? Why?
C. How reliable is the source of information?
D. What assumptions, value judgments, or attitudes actually underlie the statistics, conclusions, or opinions mentioned?
E. Is this information (or are these ideas) relevant?
F. What is being said explicitly? What is being communicated to me implicitly?

As you have been reading this book, for example, certain exceptions to general statements, concepts, or principles may have occurred to you (as you related the material to your own knowledge and beliefs). This is to be expected—and is encouraged. The greater your involvement in the material, the greater your interest, attention, thought, insight, and comprehension—all important factors that influence how well you learn.

However, we must add several qualifications. First, you must keep an open mind and not let your own beliefs, values, biases, and so forth interfere with rational perception. "Tuning out" does not result in an expanded repertoire of knowledge and experience. In this respect it would help if you develop the attitude that you must always seek to correct any mistaken ideas or opinions that you might have—given new information. A second rule is never to let yourself become so preoccupied with your own thoughts and analysis that you miss an important point. Therefore, save your analysis and evaluation until after a speaker has made the presentation. When reading material, stop occasionally to reflect upon and evaluate the material. This does not necessarily mean at the end of every sentence, paragraph, or page. When to stop and think about what you are reading is more or less a matter of wanting or having to do so. However, it is always advisable to wait until you have absorbed a complete idea and the elements that explain or substantiate it.

Principle 4: Anticipate Uses of What Has Been Learned

At the onset of the learning situation you try to recognize the importance of whatever you will be learning in order to stimulate your interest in and desire to learn it. Having initially acquired the information or skill, you are able to anticipate how it can be used to attain your goals. For example, ask yourself questions like these: Will it be useful in making future material more meaningful? Will it be useful in solving any particular problems? Even if the uses are not obvious, look for them. If you think about it, you will probably find applications. Perception of a definite use increases the information's or skill's importance to you, thereby increasing your desire to learn it well now—and then to subsequently reinforce it. If you write down something's uses, and a situation occurs where it can be used, you are more likely to recall the information or use the skill

when you need it. Develop a "use orientation" toward everything you learn. You learn something in order to use it.

Principle 5: Conscious Association

All of the above principles help you make information more meaningful and record it better in memory. However, as you make diagrams, evaluate the information, and anticipate uses, ask yourself what is happening to patterns in memory. Which existing patterns are being reorganized to include the new perceptions? Which existing patterns should you try to interconnect with the patterns being formed—because of any relationships between them? How can you best interconnect related patterns in separate memory areas? The more consciously you try to influence the formation of new patterns and the reorganization of existing patterns, the more meaningful you make the new information and the more interconnections (associations) you can help your mind form in memory. This not only makes the information more meaningful, but it also (a) organizes more representative patterns in memory, and (b) creates more interconnections that can lead to the desired information when you wish to recall it. Further, it reinforces existing patterns so that they will not be "obscured" during this process of reorganization.

Principle 6: Review

Before ending the learning situation, go back over the information, summarize it in your mind, structure it, and think about it. In short, further reinforce it.

A. Test Your Recollection - Try to form mental pictures in your "mind's eye" of the pictures, scenes, people, and diagrams that you have observed. If you cannot recall the whole and the parts and see in your mind's eye how they all fit together, then you know that you must better fix them in memory by observing them again (if possible). Using "mental conversation" (in your "mind's ear"), try to describe to yourself what you have learned visually or verbally. If you cannot describe visual information, you cannot recall it in your mind's eye. If you cannot describe verbal ideas or concepts (etc), you cannot recall them in your "mind's ear," In either case (a) you have not really learned the information, and (b) review is indicated.

B. Discuss Material With Others - (Important) By discussing something with others, or by trying to explain it to them, you reinforce your own learning. Fresh insights can occur to you. You may learn additional information or insights from others because they may not have interpreted the material exactly as you did.

   Discussion (a kind of recitation) is overt behavior. It gives you an opportunity to use others as a "sounding board." If you have learned the material correctly, they may be able to tell you so. Positive feedback is reinforcing. If, on the other hand, you have not learned the material properly, others may contradict you. If they are correct, this gives you an opportunity to correct what you have recorded in memory. Discussion, then, is another way to test how well and how correctly you have learned something. Testing is important because it prevents you from using, practicing, or otherwise reinforcing improper knowledge or behavioral responses.

C. Review Material Using the Proper Mode of Learning — If testing what you learned indicates that you have not learned it well enough to be able to recall it, or have learned it incorrectly, then go back over it. Repetition of representative patterns in memory reinforces retention and assists subsequent recall. Review can also correct faulty initial learning and replace incorrect patterns.

D. Use or Practice What You Have Learned — Once you are certain that you have learned the material correctly, you should immediately use the information or practice the skills you have just learned. By doing so you are using repetition (the "overlearning" method) to firmly fix patterns in memory. You can do this best when what you have just learned is still fresh in your mind.

All of the above principles, steps, and rules help you to learn something better the first time you perceive it. But the last four steps (A through D) help you make certain that you **learned it right the first time**. We cannot overemphasize that subsequent use or practice of incorrectly learned information or behavior will result in their being reinforced or becoming a habit. If this occurs, you will eventually have to "unlearn" the information or behavior and adjust or replace it. The trouble and effort will be unnecessary if you **learn something right the first time**.

Here is a brief review the principles and steps of **Phase 3, Simultaneous or Immediate Reinforcement**:

Principle 1: Use Notes and Diagrams
Principle 2: Use "Mechanical Aids"
Principle 3: Conscious Involvement/Evaluation
Principle 4: Anticipate Uses of the Material
Principle 5: Conscious Association
Principle 6: Review
A. Test Recollection

Table 5.1: Elements of a Systematic Learning/Memory Approach

A C T I O N S	B E N E F I C I A L E F F E C T S
Phase 1: Preparation	
Step 1: **Awareness** / Think what you're doing	consciously control influences;
Step 2: Increase **motivation**	increase concentration, interest, effort; strengthen signal to memory mechanisms;
Step 3: Seek a conducive **environment**	minimize distractions;
Step 4: Get **organized**	materials; minimize disruptions; allocate time; priorities;
Step 5: **Preview** material	structure whole and parts in mind;
* clarify present knowledge	meaningfulness;
* discover importance	motivation, concentration;
* determine method, mode, presentation	how best to structure situation;
Step 6: **Recall** and structure preview	meaningfulness; reinforcement;
* reinforce existing knowledge	reinforce patterns want to retain
Phase 2: Acquisition	
Rule 1: Consciously focus **attention**	record through necessary senses; minimize distracting stimuli;
Rule 2: Keep an **open mind**	minimize effects of adverse attitudes;
Rule 3: Use proper study habits	improve processing activity
Phase 3: Reinforcement -- Simultaneous or Immediate	
Principle 1: Use notes and diagrams	multiple sensory perception; meaningfulness; handle detail; reinforcement;
Principle 2: Use "mechanical aids"	meaningfulness; reinforcement;
Principle 3: Conscious involvement and evaluation	motivation, concentration; meaningfulness; minimize effects of adverse attitudes; validity of material
Principle 4: Anticipate uses of the information, skill, or behavior learned	motivation to reinforce; meaningfulness; program mind for awareness of opportunity to use what learn;
Principle 5: Conscious association	meaningfulness; reinforcement; improve processing in memory
Principle 6: Review	
* Test recollection of what learned	test how well learned and recall;
* Discuss what learned	check on correctness of learning; increase knowledge, insights;
* Review the information, ideas	correction of improper learning; repetition (reinforcement);
* Use or practice what learned	immediate repetition (reinforcement)
Phase 4: Reinforcement -- Subsequent	
* Use and/or practice what learned	increase retention; repetition (reinforcement); minimize adverse effects of intervening perceptions; increase meaningfulness of new material

B. Discuss the Material
C. Review the Material
D. Use or Practice What Was Learned

Phases 1 through 3 are for use in the actual learning situation. Points of Phase 3 can be used in conjunction with Phase 2. There is one more phase for learning something important well.

PHASE 4: Subsequent Reinforcement

Subsequent reinforcement of what has been recorded in memory during the initial learning process is simply a matter of using or practicing it. If the information, skill, or behavior was learned correctly, using or practicing it should result in positive feedback. Any time positive feedback sensations are associated with recorded perceptions, those perceptions are reinforced. In addition, the recorded patterns in memory are reinforced through repetition (or overlearning). More representative patterns are recorded in memory, and their presence in greater numbers increases retention and aids recall. Repetition also reorganizes patterns which may have been "obscured" by intervening perceptions since the original learning experience. This is one more way in which retention and recall are enhanced.

You want to expand your repertoire of knowledge, experience, and skills at every opportunity. Remember, however, that each time you learn something, you are probably reorganizing patterns that you may want to be able to recall. Therefore, in each new, important learning situation, use the above approach. This includes reinforcing existing patterns (unless they have been found to be incorrect given new information), and then associating new perceptions with those already recorded in as many ways as possible.

Summary of Part 2

Table 5.1 provides a capsule review of the principles, steps, and rules discussed in Part 2. We recommend keeping it handy for whenever you have an opportunity to learn something important concerning the attainment of your own (and your organization's) goals.

Summary of Chapter 5

General

Which of all the phases, steps, principles, or factors that influence learning do you think is the most important? Is it motivation? Intelligence? Present knowledge? Mental abilities that enable learning? Principles for making material more meaningful? Preparatory steps? Immediate or subsequent reinforcement or repetition? One of the other factors or principles? Actually, it is extremely difficult to pick out any one of these as being *the* most important. They are all important. They all have a powerful influence on how well we learn, retain something in memory, and recall it when advantageous. So does it not make sense to assume that, **if they all are used together in an integrated system, you will learn as effectively and efficiently as possible? Is not the use of the ENTIRE APPROACH, from advance/ongoing ACTIONS all the way through PAR to subsequent reinforcement the most important consideration**? These are the conclusions that we hope you have already drawn.

As also summarized in **Figure 5.2** on page 5-10, here is an abbreviated list of the ACTIONS that you can begin taking immediately to improve all future learning:

A. **Goal Setting and Planning** — to increase awareness of, and motivation during, important learning situations.
B. **Make a habit of using the systematic approach** — to structure use of principles, steps, rules, mental abilities, modes, methods, and existing knowledge.
C. **Increase repertoire of knowledge and experience** — to learn more in order to make each successive learning situation more meaningful.
D. **Further develop learning abilities** — to improve mental processes involved in observing, reading, listening, doing, and problem solving.
E. **Adjust other traits and behavior that can affect learning** — to compensate for potential limitations imposed by values, personality traits, interests, and other attitudes.

Since the principles, phases, steps, and rules for acquiring and reinforcing learning are reviewed on the facing page, they need not be restated here. However, we do suggest that you keep in mind the mnemonic device for recalling the phases:

Preparation - Acquisition - Reinforcement (P A R)

Table 5.2 Relationships Among the Managerial Process, Personal Goal Setting and Planning, the Analytic Approach to Problem Solving, and the Learning Process

	Managerial / Integrative Process	**Personal Motivation (Goal Setting & Planning)**	**Analytic Approach to Problem Solving**	**Learning Process**
	Preparation Steps	**Preparation Steps**	**Preparation Steps**	**Preparation Steps**
What has happened, or what is going on —and why?	**Analyze Situation** (including evaluation of past results and performance)	**Analyze (SELF)** Analyze personal characteristics and behavior. Analyze (interactions with) the environment.	**Analyze Situation** System of possibly causal of influential factors/variables and their interrelationships	**Analyze Situation** What should learn/develop; Factors affecting learning; Possible principles, modes, and methods use
What needs to be done, or what might be done —and how?	**Set Goals and Plan** **Set Goals**: what accomplish **Formulate Plans** (how to): Strategies and tactics, programs and projects, action plans **Budget** resources	**Set Goals and Plan** **Set Goals**: what accomplish **Formulate Plans** (how to): alternatives involving: Strategies and Tactics, Programs and Projects, Action Plans **Budget** resources	**Formulate Solutions** **Set Goals**: what accomplish **Formulate Plans** for Implmenting Solution(s): Strategies and Tactics, Programs and Projects, Action Plans **Budget** resources	**Formulate Plans** Set goals: what learn **Formulate** learning **plans**: Strategies, tactics, and action plans that apply appropriate *principles*, ***modes***, and ***methods*** *of learning* **Budget** resources
What course of action should be taken?	**Make Decision(s)** Analytically test, compare, and select among alternative [sets of] goals, plans, budgets, policies, and procedures	**Make Decision(s)** Analytically test, compare, and select among alternative [sets of] goals and plans	**Make Decision(s)** Analytically test, compare, and select among the alternatives	**Make Decision(s)** Analytically test, compare, and select among alternative [sets of] goals, plans, budgets, etc.
Take action; do something	**Implement Plans to:** **Organize** **Staff** **Guide, coordinate activity** **Guide control processes**	**Implement Plans to:** **Reach life goals** Obtain & evaluate **feedback** **Revise** plans as approp.	**Implement Chosen Solutions** Obtain & evaluate **feedback** **Revise** solutions as approp.	**Implement Learning Plan** **Learn** information and ideas, develop skills, modify attitudes and behavior **Reinforce** what learned

Special Emphasis

Several points or perspectives deserve special emphasis or review:

First: A thorough, comprehensive systems approach may not be appropriate for all learning situations. However, it should be used to maximize effectiveness and efficiency when learning the inputs you identified as being important during the planning stages of means-orienting your behavior using the Chapter 3 formats.

Second: We all use at least some of these principles to a greater or lesser extent. What we do not always do is stop to think what we are doing (learning) and how to do it well. When we are not purposefully using the principles, steps and rules, we are not maximizing learning effectiveness and efficiency. As in the case of problem solving, whether or not we stop to think about using PAR is a function of previous goal setting and planning. Those activities have increased the probability that (a) awareness will occur, and (b) you will use what you've learned about learning to do it well.

The following are points which relate to specific steps, principles, or rules:

Third: All preparation steps are important. None should be left out. However, since motivation and meaningfulness of material are two of the five main factors that influence learning, increasing motivation and previewing should be accentuated.

Fourth: People generally use the appropriate mode of learning without realizing it. However, purposefully thinking how to use it better can only improve learning situations. The same applies to methods of learning. Each is more appropriate for particular types of acquirable inputs, and should be used accordingly.

Fifth: The use of diagrams increases the meaningfulness of material and the mind's ability to cope with detail.

Sixth: As do other references, the learning system described here includes testing one's learning and recollection in order to assure that what one has been learned has been learned correctly. Otherwise, incorrect information or behavior will be detrimentally reinforced as they are used.

Seventh: When one is certain that the information, skill, or behavior just learned was learned correctly or properly, it should be immediately used, practiced, or otherwise reinforced.

Eighth: To assure retention in memory, and to aid subsequent recall, what has been learned should be reinforced over time through repetition (further use or practice).

Now, using this review, ask yourself the following: Why has it perhaps seemed that we often state the same point in a slightly different way in more than one place? Coming from an instructor, this is the main reason: One reader may understand something when put one way, while another may only understand it when put another way. So, hoping to "get through" to as many readers as possible, we often make the same point several different ways. What other important reason(s) involving learning principles can you give?

Relationships With Other Methods

Benefits of the personal goal setting and planning you did in **Chapter 3** should become increasingly apparent to you. *First*, it increased your motivation to perform the advance/ongoing ACTIONS that will lead to more effective and efficient future learning. *Second*, it helped you to identify specific inputs that are important for you to learn in order to reach your goals successfully. *Third*, it "programmed your mind" to become more aware of important learning situations. *Fourth*, setting goals helped to increase your motivation once you have an opportunity to learn.

A learning situation can also be a problem-solving situation, because problem solving can be the appropriate mode of learning. This means that the "acquisition" phase requires use of the problem-solving phases, steps, and principles of **Chapter 4**. However, since problem solving involves learning, one should use learning principles and practices to improve the learning that is occurring through analyzing, formulating solutions, and decision making.

In other words, **all three methodologies can and should be used with each other in order to maximize the effectiveness and efficiency with which each is used**. Therefore, as shown in ***Table 5.2***, the seemingly **separate methodologies described in this book are actually interrelated and can be used to (a) improve each other's use, and (b) reinforce each other**. This is partly what underlies the power of the integrated or "synergistic" approach we are developing part by part—until we can finally put all the parts together into the whole. And by the way, have you noticed that the analytic approach is common to all three methods discussed so far?

The following addendum presents a checklist that reviews principles regarding studying for and taking examinations. Although provided for students; it can also be used by adults in circumstances involving formal study. The do's and don'ts reflect principles discussed above.

Addendum

Studying For and Taking Examinations (A Checklist for Student Use)

1. Why do students perform poorly/? College instructors give these reasons:

   Objective and Problem Exams

   A. Didn't follow instructions
   B. Didn't read questions well enough
   C. Didn't know course material
   D. Can't use what they have learned

   Subjective Examinations (essay type)

   A. Tried to bluff
   B. Inadequate technical or general vocabulary
   C. Poor grammar, punctuation, spelling, sentence structure
   D. Didn't know course material
   E. Poor reading of questions
   F. Disorganized answers
   G. Inability to express themselves in writing
   H. Can't use what they have learned

2. How to Study More Effectively

   A. Use principles for better learning discussed above.
   B. Attend class regularly. This way you spread study (i.e., during class) over time, do not miss hearing the instructor's viewpoints, explanations, and what he thinks is important.
   C. Make a point of understanding general concepts, principles, or ideas. Don't just memorize them. Relate parts or details to the whole.
   D. Use better reading and listening skills.

3. Preparing For the Exam — A comprehensive Review

   A. What were the main points covered in the texts and lectures? State them.
   B. What are the parts, elements, or details of main principles, concepts, or ideas? State them.
   C. Can you draw a diagram which visually represents the idea, concept, or principle, and which illustrates the relationships amongst the details or parts and how they relate to the whole?
   D. Do you know the Vocabulary? Rules, formulas, or laws? Names, dates, places? Test your recollection.
   E. If you were the instructor, what questions would you include on the exam? What do you think that he or she thinks is important enough to make sure you know, or to make certain that you have not learned incorrectly? Try to anticipate. It makes you think.
   F. Get a group of people together to discuss these questions. Test each other's learning. Reinforce what you have learned. Get more facts and insights.
   G. Don't wait until the last minute to review. "Cramming" is of little value when long-term retention is required. Study on a regular basis during the course. Plan your concentrated review over a week or two before the exam.
   H. Study the material in the mode in which you will be taking the exam. If it's an oral exam, test your knowledge by reciting answers. If it will be a written exam, write out answers to anticipated questions.

4. Taking the Exam

   A. Objective Exams (short answers)

      1. Know the course materials
      2. Read the whole exam unless told not to
      3. **Read the instructions** for each part of the exam — CAREFULLY
      4. Answer easy questions first
      5. **Read each question** — CAREFULLY
      6. Check your answers

   B. (Number) Problem Exams (computed answers)

      1. 1 through 6 above
      2. What does the question ask for?
      3. What information is given?
      4. What principles, rules, concepts, formulas, or laws apply?
      5. Solve and check

   C. Subjective Exams (essay)

      1. Read through entire exam quickly but thoughtfully. Get the scope of the questions. Determine if answers might overlap, or if answering one question may help you answer another.
      2. As you preview, use notes to record ideas that occur to you.
      3. Try to determine the relative importance of each question, and therefore, how much time you will have to spend on each. Budget your time.

4. Taking each question one by one (easiest first):
   a. reread the question — CAREFULLY; make sure you understand what is being asked for.
   b. Use initial notes and organize additional thoughts into an outline.
   c. Think and get your answer organized before you start writing.
   d. Show that you . . .
      1. understand the question
      2. know the principle, formula, idea, etc., understand it, and can relate the facts or supporting evidence
      3. know the difference between theories and facts
      4. can use what you have learned (i.e., course terminology, concepts)
      5. can give your answer in an organized manner
      6. can be clear, accurate, and specific
   e. Avoid writing errors
      1. Write clearly and legibly
      2. Watch grammar, spelling, and punctuation
   f. Express yourself simply and directly. Don't try to "bluff" or add "filler" to make your answer longer. Quality counts more than quantity.
   g. Use diagrams to help you clarify your thoughts and to get your thoughts across
   h. It is not necessary to rewrite the question as an introduction to your answer.
   i. Emphasize what your instructor has emphasized. She grades you, not the textbook author.
   j. Proofread if there is time.