

Learning How to Learn

Excerpted from Educational Psychology, by E. L. Vockell and A. M. Trekles

When some people say they'd like to learn how to study, what they really mean is that they *wish* they could get better grades without doing any more work. That's not likely to happen.

This chapter is an introduction. It offers general guidelines regarding how to study and learn effectively. You can use these guidelines while reading this book or any textbook or while trying to **learn** anything else. There are three good reasons for mastering the information discussed in this chapter:

1. This information will help you use your own time most effectively while reading this book and learning to apply the principles discussed in it.
2. The guidelines discussed in this chapter give examples of many of the basic principles of the psychology of learning and instruction. By applying them yourself while you read this book and by being aware that you are applying them, you will be able to focus your attention on them more intensively and concretely. This will help you understand them more thoroughly when they are discussed in subsequent chapters of this book.
3. By learning about yourself as a learner, you'll be better prepared to help others learn. You can become a better teacher or developer of instructional materials.

By using your time more effectively to arrive at a more concrete and comprehensive understanding of these principles, you are likely to be able to apply these same principles more effectively in your attempts to study successfully – *and also to be prepared to apply those same principles when your job is to help someone else learn.*

How to Read This Text (or any text)

This section will introduce a series of twenty-six guidelines based on sound principles of educational psychology. These guidelines will suggest strategies you can employ to study more effectively while using this or any other book or any other approach to studying. **You should examine and try to understand the rationale for each guideline.** Then you should select and employ those strategies that will be most helpful to you in your own study sessions. A few of the strategies should be applied by almost all readers. On the other hand, very few readers will find it helpful to apply absolutely all the guidelines to absolutely all their study sessions.

- In some cases, you may discover that you already routinely apply a designated strategy. In such cases, continue to apply it, but you may discover that reflecting on the strategy and focusing your efforts more clearly will enable you to apply that principle more effectively.
- In other cases, you may discover that a strategy that works for other learners is unfruitful or even counterproductive for you. In such cases, you may wish to give the guideline serious thought to make sure your assessment is correct; but by all means be critical enough to ignore those guidelines that will not help you.

- In other cases, you may find that a strategy that was helpful for one chapter or unit of instruction is not helpful for another. That's fine. Be selective. Use the guidelines to help you solve problems and master whatever subject matter you are studying.

1. ***Use your study time effectively.***

This guideline is really too general to be very useful, but it needs to be stated. As Chapter 3 will show, this is really the underlying principle behind all the other guidelines mentioned in this chapter.

2. ***Arrange your study time so that you do not have to cram.***

Cramming refers to the strategy of studying desperately and at length in the hours immediately before a test, as opposed to studying more leisurely over a longer period of a longer period of time before the test.

It is certainly possible for good students to master concepts quickly and to retain the information for a long time. However, students who cram almost always allocate less time to a subject than they need. They don't take the time to follow the other guidelines listed in this chapter, and the result is superficial learning. If their goal is to use the information months or years later, when the need arises, cramming will almost always fail. Even if their goal is merely to pass an exam the next morning, cramming at the last minute is not nearly as likely to be successful as following the other guidelines listed in the rest of this section.

Although we stated this guideline as a rule for test preparation, it also applies to preparation for class or training sessions in general. You can profit most if you come to the session prepared to learn; and if you put your preparation off to the last minute, you are likely to learn less because of your inadequate groundwork.

3. ***Study in several short periods rather than a single long session.***

When you study one subject too long, fatigue interferes with your learning. One way to deal with fatigue is to rest from studying one topic by studying another. In addition, if you set a topic aside for a while and come back to it a day or so later, it is likely that you'll benefit by accidentally thinking about it during the interim and rapidly reviewing when you start the second study session.

Don't push this guideline to extremes. You need to spend at least the amount of time it takes to cover a unified segment of instruction. In general, shorter sessions are more effective when you are practicing or reviewing than when you are initially learning about a topic.

The chapters of this and other good books are often broken down into relatively short, unified segments of instruction, so that readers can stop and resume without serious distraction. A student resuming study in the middle of a chapter should briefly examine the outline of the chapter up to that point before continuing.

4. *Get yourself in the right frame of mind to study.*

Find a place to study that will be free of distractions. Then motivate yourself. Convince yourself that what you are going to learn is worth learning, that the learning materials will provide you with the information you need, and that you can actually master the information.

If you don't honestly believe that the subject matter is worth learning or if you seriously believe that it is impossible for you to master it, then it is going to be very difficult for you to do well in that course or unit of instruction. In such a case you have an "attitude problem." It is very much worth the effort to get over this problem. In almost every case there is some value in learning what you are required to study. And if you see this value, it will become much more likely that you will succeed. In fact, in almost every case it is possible for you to learn the material; and if you believe this, you will be much more likely to succeed.

Staci once took a certain literature course that she was sure was a waste of time. To this very day she still cannot understand why an accredited college would have such a useless and poorly taught course in its curriculum. Nevertheless, she had to take the course, and she needed a reason to believe the subject matter was worth learning. A group of her friends used to get together and make fun of the professor, and she discovered that if she understood the material (even though she thought it was foolish), she could have more fun satirizing the professor with her friends. She still thinks the subject matter was a waste of time, but she had a lot of fun and got an A in the course. It would have been better to value the course because it taught useful information, but at least Staci had found a reason to consider the subject matter to be worth learning.

To focus your attention as effectively as possible, examine the objectives of the unit of instruction and relate them to your own needs. In addition, if you have studied successfully in the past, have mastered important units of instruction, and have been able to apply what you have learned to real life, then you will be more likely to want to apply the other guidelines described in this chapter. Reducing anxiety and getting yourself to an appropriate level of arousal are also appropriate strategies.

The objectives at the beginning of each chapter in this book should enable you to look forward to useful outcomes after studying the subsequent information. In addition, the accompanying introductory information is designed to help you focus on realistic goals.

5. *Master basic skills to the point of automaticity.*

This means that if a concept is so important that it will be used repeatedly in future segments of instruction, master it so thoroughly that you will not have to stop and think about it every time it comes up. You cannot read effectively if you have to stop and think about even the very simple words in a passage; baseball players cannot bat effectively if they have to think about every little aspect of their swing while the pitch is on its way to

the plate; and you will not be able to understand a discussion that involves an advanced application of basic concepts unless you have an automatic understanding of those concepts.

The amount of practice readers will need to develop automaticity will vary with individual needs. We have used boldface print to identify key concepts that will be essential to understanding subsequent material. The number of these key concepts has deliberately been kept small. You should be certain to master these concepts completely, but you should by no means assume that these are the "only important things" in the book.

6. *Focus on higher-level as well as lower-level objectives.*

"Knowledge" and "comprehension" are lower-level objectives. "Analyzing" and "synthesizing" are examples of higher level objectives. Knowledge and comprehension are lower-level skills in the sense that application and other higher-level activities build upon knowledge and comprehension. Your goal in reading this book is to be able to apply the principles discussed in this book and to integrate them with other principles and activities - not just to know about them. A very good strategy is to come to a solid initial understanding of a concept or principle, then try to apply it, and obtain feedback for your application. While engaging in the application, *you are incidentally practicing (and overlearning) the knowledge that underlies that application.*

Many of the review questions in this and other books focus on the application of concepts and principles. In addition, the suggested activities at the end of chapters often recommend high-level applications of the subject matter. Finally, the text itself and especially the anecdotes often focus on concrete applications of the concepts and principles discussed in the book.

7. *Be sure to master prerequisite concepts before going on to concepts or principles that build upon these basic notions.*

This guideline overlaps with the previous one. The difference is that this guideline doesn't require that you achieve automaticity – just a clear understanding. Research clearly shows that one of the most common reasons a person fails to understand information or to master a skill is because that person lacks the prerequisite information or skills needed to succeed in the new situation. Sometimes the prerequisite information may not even be included within the present unit of instruction - for example, your textbook or instructor may assume that "everyone knows" a certain piece of information needed to grasp a topic under consideration. In other cases, earlier units of instruction contain the prerequisite information needed for subsequent units. When there is a clear hierarchy of information, it is important that you master the earlier levels before proceeding to the higher levels.

In other words, if you get an F on a chapter test, resist the urge to "just move on." Find out why you made mistakes and try to learn from them. Master the information (because it will help you with future chapters and tests) even if your grade on that quiz is permanent.

Whenever appropriate, this book has arranged topics in such a way that prerequisite information is presented in the proper order.

8. *Do not make a deliberate effort simply to read a textbook from beginning to end.*

Reading from beginning to end makes sense for novels, but it will rarely work for a textbook. This is because some of the later information will help you understand and apply earlier information. Information is often interrelated, but it has to be presented in some order. Therefore, when you first read about Concept A, you may understand it imperfectly, because to understand it thoroughly, you need a knowledge of Concept B. You may initially have an imperfect knowledge of Concept B, and this will interfere with your knowledge of Concept A. Later you will read about and understand Concept B. If at that time you go back and reread the information about Concept A, you will have a better basis for understanding it.

In this book, we describe the overall process of learning in chapter 2. One component of this process is *motivation*, which is not discussed in detail until chapter 5. Three other components are *retrieval to working memory*, *selective perception*, and *encoding*, which are aspects of *information processing*, which is not discussed until chapter 3. When you read chapter 2, you will be able to understand it, because we try to use commonsense as well as technical explanations. However, if you return to review the process of learning in chapter 2 after reading chapters 3 through 5, you will have a better understanding of the technical information, and this will enable you to understand the process of learning more completely than was possible the first time you read it.

To assist you, we have inserted links in the Expanded Online Version of this book to enable you to move both forward and backward cross-references. These annoy some readers. They say, "If you're going to refer to encoding in chapter 3, you should tell us what it is at that time!" Our advice to these people is, "Get a grip!" You will be able to understand from the context what encoding means, albeit imperfectly – just as you probably could determine the meaning of *albeit* from its context in the main clause of this sentence, even if you were not initially familiar with that word. The point is, we expect you to rethink the learning process after you understand some more about encoding in chapter 7. It *has* to be this way. All textbook authors have to do this: I'm just being a little more obvious about it and trying to help you make the connections.

Some of the summary tables that have chapter references are full of these forward references. If these build anticipation the first time through the chapter, then read them. On the other hand, if they annoy you, skip them the first time; but be sure to come back to them after you have read the subsequent chapters (perhaps when you are preparing for an exam and trying to improve a lesson plan that has proven to be ineffective..

9. *Focus clearly on the topic being covered.*

While it is occasionally useful to explore sidetracks and extraneous ideas suggested by topics and examples in the book, it is usually best to focus on the topic that the author claims to be covering. It is OK (and often valuable) to disagree with the author, but is usually best to come to a complete understanding of the author's point before you try to develop your refutations. If you don't know what the author's point is, then you had better reread or ask questions to identify the theme being developed.

The titles and headings throughout the book describe the topics accurately. In addition, each paragraph begins with a topic sentence that describes the main idea of that paragraph. This style may be mundane and non-poetic, but it is predictable, and it works. These aids should enable you to understand what the topic is and to focus your attention clearly on that topic.

10. *Focus your attention on the essential components of the topic being discussed, not on peripheral information.*

This guideline overlaps with the previous one. The additional information may be valuable, but there are times when you need to focus your attention on the exact point the author is trying to make. Sometimes you may waste time by focusing your attention on something other than what is essential to mastering the topic under consideration. If your instructor tells a joke to make a point, focus your concentration on the point, not on more and better jokes.

You have probably had the experience of spending futile hours trying to understand a topic, and then understood the topic perfectly when a different teacher (or peer) approached it from a different perspective.

Ed was once studying taekwando, and the instructor spent nearly an hour trying to show him how to execute a certain kick. When the instructor moved, another student approached Ed and said, "Just concentrate on turning your front foot, and you'll have it." Ed immediately mastered the skill and quickly realized what the instructor had been trying to say to him - Ed had simply been directing his attention at the wrong aspect of what he had heard the instructor saying.

The problem with selectively focusing attention is that the learner often doesn't know where to focus attention until after the material is mastered. Instructors, textbooks, and peers can help you. The point is that if you can direct your attention exactly where it is supposed to go, you can use your time much more efficiently.

By carefully structuring the material, this book tries to focus your attention where you need to focus it. The graphic strategies (such as color print, boldface, italics, and hot links) will also help focus attention. The tables and diagrams may also be helpful.

11. *Ask yourself questions while you read; and if you don't know the answers, reread the sections where the answers should be.*

If your questions are related to the topic covered in the text, then you should be able to find the answers. If the questions are unrelated to or expand upon the text, then you may not be able to answer them by rereading the text. In this case, you should either set the questions aside or pursue them in a different context - as by discussing the matter with an instructor or with your peers.

This book contains questions interspersed after important ideas have been developed. *If you answer incorrectly, you should reread to make sure you understand before proceeding.*

12. *Outline the main ideas of the text.*

Your brain stores information in an organized manner. By outlining, you force yourself to identify the structure of information, and your brain will be able to store it more efficiently.

Most topics in this book are already outlined, and you can discern this outline by examining the headings, subheadings, and topic sentences in each chapter. In addition, many of the diagrams are really graphic presentations of outlines. A good way to study is to try to construct your outline and then check to see if yours corresponds to the book's version.

13. *Diagram the main ideas of the text.*

The rationale is similar to outlining. In order to diagram information, you must understand the relationships among ideas. This structuring will make it easier for your brain to store and retrieve information. In addition, diagrams often have a visual framework that makes them easier to recall than a purely factual outline.

Here's a helpful hint: If the instructor or instructional materials outline the information, then you should diagram it. If the instructor or instructional materials diagram the information, then you should outline it.

This book, like most other textbooks, already contains several diagrams of significant ideas. Do not ignore them. Examine them and see if you can identify the logic behind them. Try to draw the diagrams and see if yours match those in the text. While drawing them, recite their logic to yourself. Also, one very good way to prepare for tests based on this textbook is to study thoroughly and then make one final run through all the diagrams in the chapter. If there's something you still don't understand, you need to seek further clarification.

14. *Respond actively while studying.*

Passive learning is not very effective at all. The best mode of instruction is the one-to-one tutorial, with a competent and interesting teacher interacting with a motivated learner in an applied setting. Since individualized tutorials are usually impractical, the student and teacher need to find other ways to elicit the student's active involvement. It is OK to "just

read" a novel for recreation. It is not OK to "just read" a textbook - *it is essential to involve your mind actively in the learning process.*

This book contains numerous review questions. Answer them. When you get one wrong, reread to see why you missed it. Even if there is not a question in a text you are studying, invent questions of your own, like, "Why does the author make this point right now?" or "Why don't more people know this?" One strategy that almost always works is to reexamine the topic sentence after finishing a paragraph and ask yourself, "Why is this statement true?"

15. *Have high standards, but set realistic goals.*

If you set your standards low, you'll tend to quit once you reach those minimal standards. You should set your goals high, but not so high that failure to reach them will lead to frequent frustration.

Goals are much more productive if they focus on the mastery of important objectives rather than a comparison of your performance to someone else's. In other words, it is much more useful to want to get a 90% on an exam or to learn to do something effectively than to want to do better than someone else on a test.

Goals will vary for different individuals. In many cases, a reasonable goal on tests is to shoot for somewhere between your previous performance and a perfect score. Your goals should focus primarily on your own performance - not on comparisons to other students in your class.

If a book has specifically stated objectives and frequent opportunities for testing, these should help you set and meet standards and goals. In addition, the introductory information at the beginning of each chapter may influence you in determining what your personal goals should be for a specific unit of instruction

16. *Give yourself feedback.*

You should know when you are succeeding at understanding the information in a book or presentation and - more importantly - when you are failing to meet your goals. There is little point in finishing a chapter unless you can assure yourself that you have understood and can apply what that chapter was trying to tell you. You need feedback for both small units (sections of chapters) and large units (the entire textbook) of instruction. Many students find it useful to record feedback systematically, as by keeping a progress chart of some kind.

This book contains numerous review questions. Use them to find out how you are doing. If you have a Student Workbook with study questions, use these after each chapter to ascertain your level of mastery. A good strategy is to read a chapter as thoroughly as possible, then use the available test questions for feedback. The important thing is to use informal tests and quizzes to determine how you are doing.

17. ***Give yourself corrective feedback.***

When you fail to understand a concept, find out what it is that you don't understand. Resist the urge to feel insulted and become defensive when you get a question wrong on a quiz or exam. Instead, *find out the nature of your error and come to a clear understanding of the concept or principle under consideration.* You can become an expert on a topic by making a large number of mistakes and learning from each of your mistakes.

When you miss an item in a review quiz, you should review the information in the section immediately preceding that question. In our classes we often let students "retake" a test as a group after they have turned in their individual tests. The students who learn the most are the ones who (a) use this occasion to find out the nature of their mistakes and to overcome their misunderstandings and (b) actively try to help other students do the same. The students who learn the least simply write down the answers given by the "smart" students/

18. ***Reinforce yourself for successful completion of units of instruction.***

If you feel glad that you did some work, you are likely to repeat that work and profit from it again. The best kind of reinforcement is natural or intrinsic - for example, you should read a chapter of this book and say to yourself, "That will really help me when I try to study!" Another kind of reinforcement is artificial or extrinsic: "I think I'll buy myself a soft drink (or buy a new car) because I did so well!" It's best by far to rely on **natural reinforcement**, but for many reasons natural reinforcement may be difficult to obtain for a specific unit of instruction. Artificial reinforcement of some kind is often helpful.

Sometimes feedback (guideline 16) serves as reinforcement - especially if you see yourself improving on a progress chart or getting high scores on weekly tests. One very useful strategy is to use an enjoyable activity to reinforce a study session. For example, you might obtain and watch a favorite movie video only after reading, understanding, and passing a test on a chapter in the textbook.

The feedback from the tests and review questions in this book should provide reinforcement - especially if the text has motivated you to believe that the information is worth mastering. In addition, the frequent anecdotes and direct applications should help you see ways in which the use of the information will be reinforcing to you when you use it in your actual study or teaching activities.

19. ***Keep your anxiety relatively low.***

People differ both in how easily they become anxious and in their reactions to anxiety. Some people "perform best under pressure." Others panic and become ineffective as soon as they become slightly anxious. You can be a better student if you know how you personally handle anxiety. A little anxiety can be a good thing for some people, but most students can benefit from reducing the anxiety they experience during a unit of instruction.

Fear of failure is a major source of anxiety; and so reducing the fear of failure will often reduce anxiety. For example, a student who is taking a course with clearly stated objectives, who has met these objectives, and has privately demonstrated mastery of these objectives on test items similar to those that will comprise the final examination is not likely to be debilitated by anxiety on the exam.

Falsely believing that subject matter is easy is not a good way to reduce anxiety. It is more effective to admit that the subject matter is somewhat difficult but to develop the belief (which is almost always true) that with appropriate effort you can master it.

This text tries to take an informal approach and to avoid modes of presentation that are known to arouse anxiety in students. The anecdotes are designed to personalize the information and to make you feel comfortable with the concepts and principles being discussed. Often a Student Workbook will contain items that are directly parallel to those in the Instructor's Manual; so if the instructor uses those items for quizzes and exams, the students can minimize anxiety by becoming familiar with the student items.

20. ***Study with other students.***

There are many advantages to studying with other students. Group study leads to the easy application of many of the other guidelines discussed in this chapter. For example, it is usually possible to respond actively and to receive immediate feedback and reinforcement from others in the group. Group members can help others identify and clarify misconceptions. In many cases, a "support group" can help alleviate anxiety.

However, an important caveat is in order: as a group member, you need to retain individual responsibility for your own learning and performance. If you merely sit in a group and do not respond, you are not likely to benefit from or contribute to the group's learning.

When you're helping someone else understand a topic that you have been studying, it is likely that you yourself (the tutor) will benefit even more than the person you are tutoring. This is because when you give a good explanation you have to understand and reexamine the underlying logic of what you are explaining. This benefit occurs only when you explain the logic behind your answer. If all you do is tell the other person the answer, then neither you nor that person is likely to benefit significantly.

Students can simply share responsibilities while performing activities described elsewhere in this chapter. For example, one student can look at a diagram and prompt another to reconstruct it. In addition, it is useful for individuals to try to answer questions in this book or then to score the items themselves (by looking up the information in the text) before looking at the answer supplied in the text.

21. ***Review frequently.***

Sometimes information is structured in such a way that by reading subsequent chapters you naturally reuse and review information learned in previous chapters. In other cases, you can benefit from occasionally asking yourself questions about topics covered previously

and verifying that you still understand this information. Reviewing prevents fading and encourages automaticity – being able to use knowledge that you have automatically. The frequent review questions in the text should make frequent review possible. It is also a good idea to review outlines and diagrams from previous chapters after they have been studied. Finally, it is a good idea to include questions from previous units on tests covering the current unit. For example, a 20-item test at the end of Chapter 5 might include 15 items based on Chapter 5, plus five items based on the first four chapters.

22. *Look for the relationships among ideas.*

Isolated information is very difficult to remember. Huge amounts of research show that information is retained to the extent that it is "**meaningful**." By tying ideas in with what you already know - whether it be with what you have just read or with your own personal experience - you increase the **meaningfulness** of the information and make it more likely that you will be able to remember and apply it later.

However, a caution is in order: make sure that the relationships you find are valid, accurate relationships. As the next guideline states, plausible misconceptions can actually *detract* from learning. A good idea is to identify a connection and then find a way to verify the validity of your insight.

Each chapter in this book contains introductory comments that explain the purpose of the chapter and its relationship to what has been covered previously. Similar attempts at integration appear at the end of each chapter. In addition, the numerous anecdotes relate the subject matter to real-life applications. Finally, the suggested activities at the end of each chapter recommend ideas for applying the concepts and principles to concrete situations.

23. *Be aware of and confront your own misconceptions.*

The term "misconception" may be misleading, since it assumes that your insights are "wrong." The point is that you rarely approach a textbook or unit of instruction with no preconceptions at all. You have previous experience and ideas related to almost any topic. You may approach a topic with an incorrect anticipation of what the author is trying to say. When you try to filter the author's information through your framework, the result may be a mishmash of ideas that is not at all like what the author is trying to say. Again, it is not necessary that you slavishly accept whatever ideas the author is trying to "sell" you; but it is important that you initially set aside ideas that are likely to interfere with your comprehension of what the other person is trying to say. Once you have understood the author's information correctly, then it is appropriate to evaluate it and then reject it or integrate it with your own ideas.

An example will help. The person who was mostly responsible for systematizing theories about reinforcement (B.F. Skinner) realized that there were two types of reinforcement, both of which strengthen behavior. One type strengthens behavior by *giving* something pleasant to the learner – for example, money or praise for doing good work. The other strengthens behavior by *removing* something *unpleasant* from the learner – for example, getting rid of flu symptoms as a result of taking a specified medication. Skinner called the first *positive* reinforcement (because good work

added money or praise to the person who did the good work). He labeled the second *negative* reinforcement (because the new medication removed the flu symptoms from the sick person).

For most ordinary people, however, this notion of negative reinforcement is very confusing. This is because they think that negative reinforcement is either (a) another word for punishment (which weakens a behavior) or (b) a term that refers to the strengthening of a negative behavior. In this book, we try to avoid the confusion by using the term Type I reinforcement when something pleasant is added, and Type II or III reinforcement when something unpleasant is removed.

Based on the previous experience of the authors, this book tries to identify misconceptions that you are likely to hold and to help you differentiate between these misconceptions and the information presented in the text.

24. *Use mnemonic strategies when appropriate.*

A mnemonic strategy is a gimmick that helps you remember things. For example, as a child you might have learned "I before E except after C" as a spelling rule or "HOMES" as a way to remember the first letter in the names of the Great Lakes (Huron, Ontario, Michigan, Erie, and Superior). These strategies are especially useful for memorizing vocabulary terms or lists of items. Certainly you should want to do more than merely memorize information, but basic memorization may help you recall information for higher-level learning activities.

Specific mnemonic strategies are sometimes suggested in the text. However, you may prefer to invent your own.

25. *Monitor your thought processes.*

By being aware of what you are doing mentally, you can focus your attention more effectively on what you are trying to do. A word of caution: this can be overdone. Your main goal is to learn and apply information, not to analyze how you obtained it. An artificial focus on your thought processes may actually interfere with the acquisition of important information. Focus on your thought processes long enough to make plans and to make sure you are engaging in appropriate activities, but then concentrate on the actual task at hand.

To use an analogy - an excellent professional basketball player will be able to describe exactly how he shoots a foul shot. This awareness is immensely helpful. However, when he actually shoots the foul shot, he does it without thinking about the individual aspects of that shot. In fact, in an important situation, the opposing coach may call time out to give the player "time to think about it." Likewise, when you are studying, you should be able to stop and describe your plans or analyze what you have been doing; but while you are actually studying or solving a problem, you should carry out these thought processes without devoting direct attention to them.

The chapter that you are now reading is an attempt to provide you with the ability to monitor your own thought processes more effectively. As you read the expanded discussion of each of these principles throughout the book, you will understand

these processes more completely and be able to monitor your use of them more productively.

26. *Try to work at a moderate level of arousal.*

Arousal is related to but not identical to anxiety. Level of arousal refers to your overall psychological and physiological excitement while you are trying to study. The research shows that most people work best when they are neither over-aroused nor under-aroused, but at a medium level of arousal. Level of arousal is influenced by both psychological and physiological factors. Such factors as familiarity, repetition, weariness, and the operation of the digestive system lower levels of arousal. Such factors as novelty, surprise, humor, anxiety, insight, anticipation of success, and a burst of cold air increase the level of arousal.

If you are learning ineffectively because your level of arousal is too high, you should do things to lower it - such as going to a quiet room, reducing anxiety, or studying something with which you are already familiar. If your problem is that you are under-aroused, you should do things to increase your level of arousal - such as looking for the humor in an anecdote, focusing on how a piece of information will lead to an important insight, opening a window to let in cold air in the winter, or moving to a less soporific environment.

The book tries to lower level of arousal primarily by trying to minimize anxiety. On the other hand, it tries to **increase** level of arousal by stating interesting and challenging objectives; by using an interesting style of presentation; by using anecdotes, personal experiences, and occasional humor; and by various graphic and printing strategies, such as colored text, indenting, and boldface.

One chapter in this book that was exceedingly long was broken down into three smaller chapters primarily to avoid reducing the readers' level of arousal by becoming tedious. In addition, the paragraph that you are now reading is indented in order to minimize the monotony that could occur with page after page of identical-looking text.

27. *Do not try to study too many similar things at the same time*

For example, one of the authors once tried to learn French and Spanish during the same semester. This was very confusing, and he dropped the Spanish course. Years later, after he already knew some French, he tried Spanish again and found it much easier. Likewise, if you've ever tried to watch two major league baseball games on two channels at the same time, you were probably confused. On the other hand, it is actually fairly easy to watch a baseball game on television while reading a romantic novel or proofreading this chapter. If you find two concepts to be so similar that they are confusing, a good idea is to study them one at a time. Once you have understood the two separately, then it may be desirable to make specific comparisons between them and benefit from the comparisons.

Topics that are likely to be confused are deliberately separated in this book. After both topics have been introduced, they are brought together and compared to help you identify the significant characteristics of each.

Summary

Guideline	Principle
1. Use your study time effectively.	The effective use of learning time is the single factor most strongly related to student performance. The most effective way to use study time is to see to it that you perform at a high level of success by implementing the phases of learning discussed in chapter 2.
2. Arrange your study time so that you do not have to cram.	The effective use of learning time is the single factor most strongly related to student performance. Cramming is not likely to result in high rates of Effective Learning Time. Cramming is likely to consist of rote memorization; meaningful learning is more likely to be efficient and productive.
3. Review in several short periods rather than a single long session.	This is the most efficient use of Effective Learning Time Once information is learned, distributed practice is superior to massed practice for promoting retention
4. Get yourself in the right frame of mind to study.	This is an important metacognitive skill. This is likely to result in improved motivation.
5. Focus on higher-level as well as lower-level objectives.	Higher order thinking skills are important outcomes of instruction (See Bloom's Taxonomy and Gagne's Outcomes) There are good strategies for learning these skills.
6. Master basic skills to the point of automaticity.	Skills that are used often must be overlearned; otherwise learning will be impeded when these skills are needed.
7. Be sure to master prerequisite concepts before going on to concepts or principles that build upon these basic notions.	It is important to recall prerequisite knowledge in order to learn more advanced concepts and skills. Skills that are used often must be overlearned; otherwise learning will be impeded when these skills are needed. This makes learning more meaningful
8. Never make a deliberate effort simply to read a textbook from beginning to end.	Information from a later chapter may serve as prerequisite information for earlier chapters.
9. Focus <u>clearly</u> on the topic being covered.	Selective attention is necessary in order to move information from the sensory register into working memory. Selective perception is a key element of the learning and instruction process.

<p>10. Focus your attention on the <u>essential</u> components of the topic being discussed, not on peripheral information.</p>	<p>Selective attention is necessary in order to move information from the sensory register into working memory. Focusing on non-essential elements is a major cause of negative transfer. In addition, selective perception is a key element of the learning and instruction process.</p>
<p>11. Ask yourself questions while you read; and if you don't know the answers, reread the sections where the answers should be.</p>	<p>This is an important metacognitive skill (metacomprehension). Active involvement with information leads to more effective encoding (Chapter 7). Generative learning is more productive than passive learning.</p>
<p>12. Outline the main ideas of the text.</p>	<p>Deliberately organizing information is an important metacognitive skill. Active involvement with information leads to more effective encoding.</p>
<p>13. Diagram the main ideas of the text.</p>	<p>Deliberately organizing information is an important metacognitive skill. Active involvement with information leads to more effective encoding.</p>
<p>14. Respond actively while studying.</p>	<p>Active involvement with information leads to more effective encoding. Responding is a key element in learning and instruction. Generative learning is more productive than passive learning.</p>
<p>15. Have high standards, but set realistic goals.</p>	<p>Effective goal setting is an important metacognitive skill. Effective goal setting is important to motivation.</p>
<p>16. Give yourself feedback.</p>	<p>Feedback for effective performance is often a powerful form of reinforcement. Goal setting and related feedback are important components of motivation. Goal setting and related feedback are important components of the conceptualization of learning and instruction.</p>
<p>17. Give yourself <u>corrective</u> feedback.</p>	<p>Good corrective feedback often leads to effective shaping of appropriate behavior. Corrective feedback helps route the learner effectively through appropriate events of instruction.</p>
<p>18. Reinforce yourself for successful completion of units of instruction.</p>	<p>Reinforcement of behaviors makes it more likely that similar behaviors will be repeated in the future. When behaviors are not reinforced, they are likely to undergo extinction</p>
<p>19. Keep your anxiety relatively low.</p>	<p>Anxiety is likely to lead to undesirable affective outcomes.</p>

	High levels of anxiety or other forms of arousal are likely to result in lowered motivation.
20. Study with other students.	Cooperative learning often leads to improved academic performance. Peer tutoring is likely to help the tutee, but it often helps the tutor even more. This often results in effective organization of information and overlearning by the tutor.
21. Review frequently.	Behaviors persist longer if they are frequently and intermittently reinforced. Distributed practice is more useful for review than massed practice for preventing fading. This final event of instruction is often overlooked.
22. Look for the relationships among ideas.	Meaningful information is more easily encoded and retained longer than rote information.
23. Be aware of and confront your own misconceptions.	Learners actively construct knowledge, and misconceptions are likely to lead to further inaccurate understandings.
24. Use mnemonic strategies when appropriate.	By connecting new information with existing information, the new information is encoded more efficiently and retained longer.
25. Monitor your thought processes.	The successful use of metacognitive skills leads to impressive improvements in academic performance.
26. Try to work at a moderate level of arousal.	Extremely high or low levels of anxiety or other forms of arousal are likely to result in lowered motivation.
27. Do not try to study too many similar things at the same time.	Proactive and retroactive inhibition occurs more often when new information is similar to old information.