

ELEVENTH EDITION



RECOMMENDED FOR NATIONAL DISSEMINATION BY THE U.S. DEPARTMENT OF EDUCATION

TABLE OF CONTENTS

Chapter 1: Starting Out	1
College—Your Future of Possibilities	1
Why is College Important?	2
Education and Income	2
Questions About Going to College	3
Thinking Skills for the 21st Century	
Succeeding with Learning to Learn®	4
<i>Student Voices</i>	4
Why is this book sub-titled “Thinking Skills for the 21st Century”?	5
Thinking Strategies of Successful Students	6
Why are the LTL Skills so Effective?	6
Meeting Academic and Personal Goals	8
Choosing Courses: Surviving an Unstructured Curriculum	9
Finding and Using Campus Resources	10
What’s unique about your college or university?	11
Introduction to the LTL Journal	12
Why are You in College?	13
<i>Reaching for the Top 1: A Pre-Course Self-Assessment</i>	14
 Chapter 2: Critical Thinking Skills	 17
Barriers to Learning	18
Using Critical Thinking Skills	22
The Active Mode	22
Using Your Best Natural Thinking Skills	23
Evaluative Thinking	24
<i>Empower Yourself: Solving Problems with</i>	
the Four LTL Thinking Tools	26
<i>Student Voices</i>	27
Learning Styles	28
Different Kinds of Learning Styles	28
Left- and Right-Brain Learning Styles	29
Detail-Focus/Big Picture Learning Styles	35
High and Low Structure Learning Styles	37
When Do You Learn Best?	39
What is <i>Your</i> Learning Style?	40
<i>Empower Yourself: Don’t Let Labels Limit You</i>	41
The Structure of Learning	42
Both Sides of Your Brain Games	43
 Chapter 3: Generating Questions	 45
From Lecture Notes	45
Questioning—the Key to Learning	46
<i>Student Voices</i>	46
Student Sample: Before LTL	47
Student Sample: After LTL	48
Taking Lecture Notes	49
Using Abbreviations	50
Generating Questions from Lecture Notes	52
Asking Mirror Questions	52

Summary Questions	54
Writing Higher-Level Questions	55
Asking Good Questions	56
Asking Subject-Relevant Questions	57
Using Mirror Questions to Prepare for Exams	58
Going Beyond the Information Given	59
“What if...?” Questions	59
Creative Questions	61
Evaluative Questions	61
<i>Empower Yourself: Asking Good Questions Beyond College</i>	63
Classroom Issues	64
Lecture Classes	64
Seminar Classes	64
Getting to Know Your Professors	65
Self-Evaluation Checklist	66
The Prediction Game	67
 Chapter 4: Reading to Answer Questions	 69
Reading Textbooks	70
Student Sample	72
<i>Student Voices</i>	73
Reading Without Headings	76
Supplemental Readings	78
Speed Reading	79
Reading for Examples	80
Reading Literature and Poetry	84
Self-Evaluation Checklists	87
The Cost/Benefit Game	89
 Chapter 5: Time/Task Management	 91
What’s Wrong with Most Time Management Systems?	92
What’s Different About the LTL Time/Task Management System?	92
How Do You Use Your Time?	93
Step 1: Taking Data: How Do You Spend Time Now?	94
Data Collection Chart	95
Step 2: Interpreting the Data	97
Step 3: Setting Priorities with a Task Management “To Do” List	97
Step 4: “To Do” Lists	98
Using Task Management Checklists	98
Step 5: Task Management Checklists and LTL Skills	99
Step 6: Using a Task Management Checklist for Academic Tasks	99
Step 7: Using Time Breaks as Rewards	100
Taking Creative Breaks	100
Step 8: Using Question Charts in Task Management Checklists	101
Step 9: Preparing for Exams with Task Management Checklists	101
<i>Student Voices</i>	102
<i>Empower Yourself: Using Task Management Checklists for Daily Life</i>	103
The Task Management Game	105

Chapter 6: Preparing for Exams by Using Both Sides of Your Brain	107
Integrating Left- and Right-Brain Learning	107
Question Charts	108
Is it Hard to Construct Question Charts?	110
Building Question Charts	111
<i>Student Voices</i>	111
Predicting Objective Test Questions with Question Charts	114
Preparing for Objective Tests with Question Charts	115
Studying for Objective Tests: Defining Terms	118
Taking Objective Tests	119
Essay Exams and Key Word Diagrams	120
Student Sample	123
The Mind Map: A Special Kind of Key Word Diagram	125
Student Sample	127
<i>Empower Yourself:</i> Attaining Goals with Key Word Diagrams	128
Writing Mock Exams	130
Student Sample	131
Writing Essay Questions	132
Reading Essay Exam Questions	133
<i>Empower Yourself:</i> Getting Past the Anxiety Cycle	136
Computing Your Grade Point Average	137
<i>Student Voices</i>	137
Self-Evaluation Checklists	138
The Question Chart Game	139
The Reading Essay Exams Game	139
 Chapter 7: Learning Technical Information	 141
Technical Note-Taking	142
Leaving Notebook Pages Blank	143
Reading Math-Based Textbooks:	
Dividing the Chapter into Small Units	144
Student Sample	145
Analyzing End-of-Chapter Problems	146
Reading Graphs, Tables, and Diagrams	149
Reading Computer Science	151
Understanding Math: Translating Math Into Words	153
Student Sample	154
Solving Word Problems in Math-Based Courses	155
Writing 50-Point Questions in Science	156
Learning Technical Terms: Picturing Ideas	157
Self-Evaluation Checklists	161
 Chapter 8: Writing & Research	 163
Writing to Answer Questions	164
Using Questions to Write Good Paragraphs	164
Student Sample	167
Writing Term Papers	170
<i>Empower Yourself:</i> Finding What You Need	
When Writing Term Papers	174
<i>Student Voices</i>	175

Using a Writing Flow Chart	176
The Editing Checklist for Revising Rough Drafts	177
Editing Checklists	178
Steps to Better Grammar	178
Steps to Better Spelling	178
<i>Empower Yourself</i> : Solving Personal Problems with Editing Checklists	179
What is True? The Issue of Verification	180
What is <i>Not</i> Valid Research? The Issue of Plagiarism	180
Informal Ways to Use the Library	181
Putting It All Together	181
The Learning to Learn® Scholarship Contest	182
<i>Student Voices</i>	182
The Writing Game	183
 Chapter 9: Being All That You Can Be	 185
Your Private Laboratory	186
Success Inventories	187
Taking Initiative	187
Feeling Personally Competent	188
An Alternative to the Blame Game	189
What Are Your Learning Habits	190
A "Personal Snapshot"	191
<i>Student Voices</i>	191
<i>Empower Yourself</i> : A Positive "Personal Snapshot"	192
Being Your Own Best Friend	194
Looking Towards the Future	198
<i>Empower yourself</i> : Picturing the Future	200
Find Your Values	201
<i>Empower Yourself</i> : Using Your Fears Creatively	204
Self-Discovery Games	205
 Chapter 10: Relationships	 207
Personal and Social Changes in College	207
Using the Four LTL Tools in Relationships	208
Feeling Left Out—How to Connect with People	208
Ethics in Relationships with Others	209
Developing Leadership Skills	210
Friends: People You Can Count On	211
Being a Commuter Student	213
Dating	214
Diversity: Relating to Other Groups	215
Classroom Simulation	216
Sexism and Sexual Harassment	217
<i>Applying LTL Thinking Tools: Relationships</i>	218
Internet Exercise	218
A Game of Imagination: The Dinner Party	219
 Chapter 11: Being Healthy	 221
Reducing Stress	222
Relaxation Techniques	222
A Stress Management Exercise	223

<i>Applying LTL Thinking Tools: Managing Stress</i>	225
<i>Empower Yourself: Taking Control of Your Life</i>	226
The Food You Eat	227
An Easy, Fat-Free Diet	227
Eating Disorders	228
Exercise	228
<i>Applying LTL Thinking Tools: Food and Fitness</i>	230
The Question of Sex	231
Birth Control	232
Sexually Transmitted Diseases	233
What Every College Student Should Know About AIDS	234
Protecting Yourself from Sexual Assault	235
Addictions	236
Alcohol	236
Drugs	239
Cigarettes	241
<i>Applying LTL Thinking Tools: Controlling Addictions</i>	242
Internet Exercise	242
Lending a Helping Hand	243
 Chapter 12: Going Back to School	 245
Do You Belong in College?	245
Changing Student Populations	245
Succeeding in College	246
Will College Take Too Long?	246
Is College Worth the Effort?	247
Campus Services for Adults Returning to School	248
Relationships at Home and Work	249
Building from Experience	249
<i>Student Voices</i>	249
Personal Relationships	250
Relationships with Your Spouse	250
Relationships with Your Children	251
Child Care	252
Relationships with Your Friends	253
Relationships at Work	254
Relationships with Your Co-Workers	255
Learning to Learn® at Work	256
<i>Empower Yourself: Using LTL at Work</i>	256
Using LTL Skills in Daily Life	257
<i>Applying LTL Thinking Tools: Returning to School as an Adult</i>	258
Internet Exercise	258
The Returning to School Game	259
 Chapter 13: Practical Matters	 261
Handling Your Finances	262
Living on a Budget	262
Weekly Expense Record	264
<i>Student Voices</i>	264
Using Credit	265
Obtaining Financial Aid	266
Internet Exercise	267

<i>Applying LTL Thinking Tools: Financial Matters</i>	268
Your Career: Choices for the Future	269
Self-Assessment	269
Course Selection and Transferable Skills	270
Information-Seeking Interviews	272
Establishing a Contact Network	272
Creating a Career Exploration Portfolio	273
<i>Applying LTL Thinking Tools: Career Planning</i>	276
Internet Exercise	276
Careers Game	277
 Chapter 14: Service Learning	 278
What is Service Learning?	279
Examples of Service Learning Projects	279
The History of Service Learning	280
Service Learning in Higher Education	281
Keys to Effective Service Learning Projects	282
Steps for Developing Service Learning Projects	283
Web Resources for Service Learning Projects	284
The Service Learning Game	286
<i>Reaching for the Top 2: Assessing Your Progress</i>	287
Conclusion	290
Index	291

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Marcia Heiman is Chief Executive Officer of Learning to Learn, Inc., a consulting and publishing firm in Cambridge, Massachusetts. The firm provides Learning to Learn® (LTL) seminars and materials for educators and business persons.

Dr. Heiman has developed and researched the effectiveness of LTL for 30 years. She served as director of college learning centers at a number of colleges and universities, including the University of Wisconsin-Madison, the University of New Hampshire, Roxbury Community College, and Boston College. She has tested the impact of LTL on her own students. LTL's controlled studies showing measurable changes in learning have been externally validated by the U.S. Department of Education. The Department has recommended LTL for national dissemination; it is now used at colleges and universities throughout the nation.

Dr. Heiman holds a Bachelor of Arts from New York University, a Masters in Research in Instruction from the Harvard Graduate School of Education, and a doctorate in Behavioral Sciences from the University of Michigan.



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Dr. Heiman and Mr. Slomianko are also the developers of the National Education Association's Building Thinking Skills series; the editors of Thinking Skills Instruction: Concepts and Techniques, the authors of Learning to Learn® – Critical Thinking Skills for the Quality Workforce; and the developers of Learning to Learn®, an interactive video course which IBM has made available to its entire workforce worldwide.

Chapter 1:

STARTING OUT

COLLEGE

—*YOUR FUTURE OF POSSIBILITIES*

Going to college marks the beginning of a significant and exciting change in your life—whether you’re just out of high school or an adult returning to school. New doors are opening to you. There is an aura of promise and opportunity. It certainly feels like you’re standing on an important threshold—where at last you’ll find the means and conditions to realize your hopes and dreams—and your place in that future.

At times these “grand” feelings may seem out of proportion and overblown—but they are good and appropriate. Still, you may have other feelings as well: doubt in your ability, fears that you will fail others who depend on you. Those are also natural and appropriate feelings. Although the potential of the future seems unlimited, your doubts about your ability and worthiness can destroy your high spirits. To try to ignore these feelings of insecurity is futile. Even if you could hide these feelings from yourself, you’d miss the important message they carry. Your fears and doubts say, “I’m not prepared. I may fail.” Being aware of these feelings is like recognizing signs of danger—they’ll help you take preventive action. Use these warning signs to prepare yourself, to ensure that your dreams, however daring, will become realities.

In this chapter we’ll start you on your way. We’ll begin by introducing you to Learning to Learn®—which forms the basis of this book. Using LTL, you’ll learn to develop your natural thinking skills. You’ll use LTL both for improving academic skills and for making needed personal and social changes in your life. Next we’ll take a look at two areas you’ll need to address as you begin college—choosing courses and finding and using campus resources. Finally, our Reaching for the Top Self-Assessment will help you get a picture of who you are now, as you enter this new world.

WHY IS COLLEGE IMPORTANT?

Some of the key reasons why college is important:

◆ **More choices.** The world of the 21st century will offer a wide variety of career choices. We can only begin to imagine the exciting choices that will be available with rapidly expanding technology. And with the continuing revolution in electronic communications, there will be freedom to work from many different locations. The cartoon of a person lying on a beach while working at the “office” is rapidly becoming a reality for many people.

But these choices are only available to people with skills—and with college degrees.

◆ **Making the most of your talents.** In the same way that you don’t know what the future will bring in career choices, you don’t know *yourself* well enough to assess your place in that world. Your talents can only be discovered—and developed—with a college education.

◆ **Standard of living.** As the chart below shows, a college degree can significantly increase your financial income and opportunities.

Education and Income

Studies show a strong relationship between education and lifetime earnings. This relationship is clear in the chart below:

Level of Education	Average Annual Income*
Master’s degree	\$62,300
Bachelor’s degree	\$52,200
Associate’s degree	\$38,200
High school graduate	\$30,400
Some high school	\$23,400

What do these figures mean to you? They mean that as a college graduate you would earn an average of \$109,000 more than high school graduates for every five years you are in the workforce—and this trend will probably accelerate. In 40 years of employment, your lifetime earnings as a college graduate would be about \$872,000 more than as a high school graduate.

QUESTIONS ABOUT GOING TO COLLEGE

I don't remember much of what I learned in high school. Besides, the way I see it, a lot of information is useless in real life. So what's the point of college—especially a liberal arts degree?

There are two answers to that question.

1. *Job-related skills.* Whatever content you study in college, you'll acquire important skills which are valued by employers in today's fast-changing economy: For example, you'll learn to plan; to organize information; to weigh the pros and cons of different situations and different approaches to a problem; to analyze and use new ideas. You'll also learn how to *perform under pressure*—a skill of value to you, and to every potential employer.
2. *The value of lifelong learning.* For the most part, high school courses do not make you think—and they do not require much commitment to the information presented. In college, you'll get the chance to become intellectually and emotionally involved in what you're learning. This can enrich your life and stimulate your interests in ways that help you discover new aspects of life. Bear in mind that learning can do more for you than you think. Learning can be an important, lifelong process.

I can see that college is important in the long run. But in the short term, it's expensive. How can I afford college on limited funds?

There are many routes to finance a college education. We'll give you a guided tour of financial aid possibilities in Chapter 13.

I never did very well in school. Won't college just be more of the same?
Or:

I did okay in high school, but I understand there's a lot more homework in college. How will I get everything done?

What you lacked before was an effective way to harness your skills. In this course you'll acquire a method—Learning to Learn®—which will enable you to succeed academically with ease and confidence.

Turn to the next page, and we'll tell you more about that.

THINKING SKILLS

FOR THE 21st CENTURY

Succeeding With LEARNING TO LEARN®

What can you really do to ensure your success in college? For starters, you have to find the right entry point for your efforts. Taking Learning to Learn® (LTL) as a freshman gives you the opportunity to become a successful learner, able to achieve your goals, and to be an active problem-solver—in college, your later career, and in your daily activities.

What's so special about LTL? LTL provides students with thinking skills that result in significant, long-term effects on students' academic success and retention in college. For more than 20 years, the U.S. Department of Education's Joint Dissemination Review/Program Effectiveness Panel examined the effectiveness of programs at all levels of education. More than 700 educational programs were investigated. The panel found that LTL is the *only* college-level program that:

- ◆ impacts on both average and non-traditional students;
- ◆ significantly improves college students' *grade point averages* and *retention* through graduation;
- ◆ does not require subject-matter tutoring.

Aren't these just study skills I learned in high school?

Learning to Learn® is based on basic research on how learning occurs. All of the LTL skills stem from research on strategies of successful learner. Even the organization of the exercises in this book reflects research in the psychology of learning: The skills in this book build on each other in a sequence—and are interrelated as a system of learning—which will result in long-term changes in how you learn.



Student Voices

DeBorah Mills

To be really honest with you, when I started college I was having a rough time. I'm a first generation college student from Newark, NJ, and in a lot of ways I was not prepared for the demands of college. I was overwhelmed. I feel that Learning to Learn saved my college career and opened doors for me.

LTL opened me up to learning. With the LTL skills, I have a firm foundation to lean on. I can absorb new information, do well on exams, write good papers—I feel transformed, really confident as a student now. LTL definitely made a big difference in my life. I can't say enough good things about it—and I've been telling my old high school principal about LTL, getting him interested in bringing LTL to students there.

Why Is This Book Sub-titled “Thinking Skills For The 21st Century?”

What and how you learn have wider consequences—beyond college.

We're living in an era of a global economy. The U.S. Department of Labor and the American Society for Training and Development (ASTD) conducted a study of over 6,000 large and small businesses to determine skills needed for 21st century employees. The study shows that large and small companies valued knowing how to learn as the most fundamental skill for the next century:

"Learning to learn... knowing how to learn—is the most basic of all skills because it is the key that unlocks future success. Equipped with this skill, an individual can achieve competency in all other basic workplace skills." ¹

Subsequently, ASTD worked with the developers of LTL to create a version of the LTL program for business and industry. Because of the increased demand on corporate learning, many corporations are now interested in having their workers trained in LTL.

This means that students trained in LTL not only benefit from higher graduation rates, with better grades and skills. They also have an “edge” in the workplace—and in entering a workplace that is guided by the principles of a learning organization.



¹Anthony P. Carnevale, et al., *Workplace Basics: the Skills Employers Want*, pp. 8-9, 1988: Washington, D.C. American Society for Training and Development and the U.S. Department of Labor, prepared under Grant No. 99-6-0705-75-079-02 under Title IV, part D, of the Joint Training and Partnership Act of 1982.

THINKING STRATEGIES OF SUCCESSFUL STUDENTS

Why are the LTL skills so effective?

Most learning improvement systems are based on a version of the medical model: They diagnose—attempt to find out what’s wrong—and offer solutions based on their diagnosis. But there are many ways to do something badly, and only a few ways of doing it right. So it’s not fruitful to apply the model of diagnosis and remediation—that was so successful in medicine—to education.

With the medical model approach, there are endless options for intervention. And many learning improvement programs try to cover all those possibilities. This approach doesn’t work well for college learners: Most diagnosis-and-remediation learning improvement programs show only a year’s gain in a year’s time. No college student has time for this kind of slow-acting remedy.

By contrast, LTL is based on research on the *learning and thinking* strategies of *successful learners*. It was found that successful students use four major thinking strategies. They

- ◆ ask questions of new material presented in lectures or books—thinking about which questions the material answers, and which it does not;
- ◆ break up large tasks and complex ideas into smaller parts;
- ◆ are goal-directed; direct their study to meet their instructors’ objectives; and
- ◆ take feedback, testing themselves informally to see how much they’re learning.

These are *natural* learning skills. They are used on a daily basis throughout life. For example, a boy who has just made a base hit asks himself a series of *questions*: Can he steal the next base? Is the pitcher thinking about the next batter? How fast is the first baseman? By thinking about these questions, he breaks up a complex task into *smaller parts*. His behavior is *goal-directed*: He wants to get to second. And he takes *feedback*: If the pitcher checks him out, he’ll stay close to first.

You’ll learn how to use these strategies in a mindful way throughout this book, using the *Four LTL Thinking Tools*.

If these are natural learning skills people use every day, why do so many people fail in school?

From a very early age, we are taught that learning in school is different from other kinds of learning, and that it requires special skills not used in other parts of life. We are taught to look only for the “right” answers, and we memorize in order to produce those answers on exams.

Using natural thinking skills is seldom rewarded in elementary and high school. In fact, students who look for creative solutions are often misunderstood.

With LTL, you’ll learn to use your *natural thinking skills* more effectively, both in and out of school. And you’ll be able to attain goals that seemed out of reach.

How will these natural thinking skills affect my performance in college?

We’ll refer to the *Four LTL Thinking Tools* throughout this book. In this course, you’ll learn concrete skills that are based on these thinking tools; we’ll show you how to apply these skills to your content course work.

- ◆ *Questioning* the material from books and lecture notes brings academic study closer to your experience in “real” life. When you ask *questions* and make *guesses*, you’ll tell yourself, “I disagree/agree with this,” or “This reminds me of...” You’ll think ahead: “Is this topic leading to...?” You’ll become a more active learner, bring to the table what you’ve learned elsewhere—not just waiting for a table of answers. *And* you’ll predict your exam questions.
- ◆ *Breaking up material into smaller parts* will allow you to manage your time better—and deal with issues in a modular way. Being *goal-directed*—directing your studying to meet your (and your instructors’) objectives—will help you find important facts and ideas in your class notes and textbooks. Combined with the questioning methods, working through small learning tasks will help you test yourself—so that you can *assess your learning progress* before your instructors do. This frequent self-assessment will enable you to make important changes in your performance.

At first, LTL may seem like a collection of separate skills. But when you begin to apply the skills, experiment with different combinations of our methods, and adapt them to your needs, you’ll begin to see LTL as a *system* of writing *questions*, breaking up complex tasks and ideas into *smaller parts*, setting *learning goals*, looking for *feedback* on your completion of these goals—and evaluating the process you went through.

MEETING ACADEMIC AND PERSONAL GOALS

In this book you'll learn methods of questioning the world around you, both in and out of school—methods that will improve your learning and thinking. You'll also learn how to shape parts of your life that need improvement. You'll develop a consistent approach to problem solving in both academic and non-academic areas of your life, and you'll solve problems creatively.

College is primarily about learning. We'll begin by exploring issues related to how people learn—including the concept of learning styles. We'll show you how to apply the LTL academic skills to your content courses. We'll present unique LTL methods for taking notes, reading, managing your time, taking tests, and writing research papers. This book is very *interactive*, with lots of exercises to practice the new skills you'll be learning. The skills you'll learn in these areas are all based on the *Four LTL Thinking Tools*.

But succeeding in college also means finding solutions to personal and social problems. Several features of this book will help you integrate what you're learning into both your academic and your personal life:

- ◆ *Empower Yourself:* These segments will help you use specific LTL skills to solve problems and sort through issues in the non-academic parts of your daily life.
- ◆ *Student Voices:* These passages contain personal stories of students like you who have taken LTL. You'll read about students you can identify with—recent high school grads, adults returning to school, students with a wide range of backgrounds—who have used LTL to succeed in college and beyond.
- ◆ *Reaching For The Top:* At the end of this chapter we've included an inventory where you can assess yourself in a number of areas related to college life. You can chart how close to the top you are now by filling in the *Reaching for the Top* bar graph. At the end of Chapter 14, there's another form of this inventory, with another bar graph. You can score yourself and compare the two bar graphs to see the gains you've made—how close you are to where you want to be.
- ◆ *Life Skills Issues:* In addition to the LTL academic system, we'll present life skills issues, including values; relationships with others; being an adult or a commuting student; reducing stress; taking care of yourself physically; financial matters; and career planning. LTL thinking tools are shown throughout these sections. You'll learn how to apply the *Four LTL Thinking Tools* to solve personal and social problems in these areas.

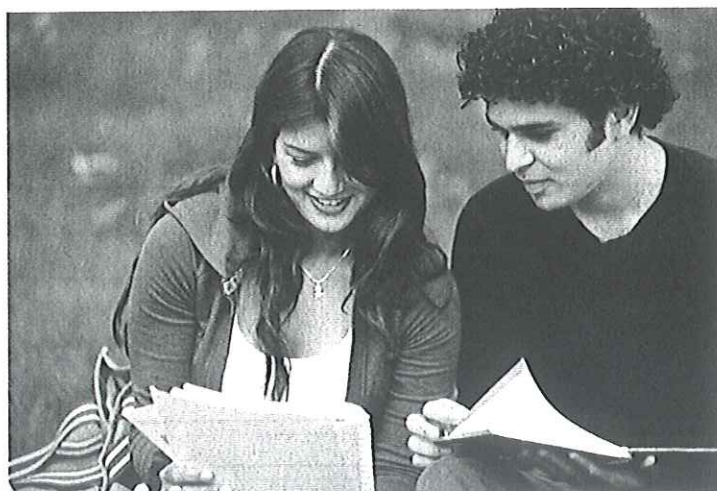
CHOOSING COURSES

Surviving An Unstructured Curriculum

Most colleges have a fairly unstructured curriculum. You'll have more academic choices than you've ever had. You'll be able to take most of the courses you choose, and you might be able to sign up for as many courses as you wish. When you learn how to "work the system," this wide range of academic choices can be fun. In the beginning, having too many choices can be stressful and unnerving. There's a good reason for this: You can make serious mistakes. You're like a visitor from a third-world country in an American supermarket: There are so many choices that it's confusing.

Here's how to avoid the dangers of an unstructured curriculum:

1. *Don't sign up for too many courses.* Particularly at 2-year urban colleges, students are often anxious to complete a degree in order to re-enter the workforce more competitively. For that reason, they may be tempted to sign up for more credit hours than they can handle. Think twice about your course load. Many new students find that the work load of several courses is too heavy to carry; they drop many of their courses; and because they began by trying to do homework in *all* of the courses, they never really catch up in the courses they keep. In general, don't take more than 4–5 courses each term.
2. *Use the advisor assigned to you when you choose courses for your first year at college.* Your advisor will be able to help you take a balanced curriculum that builds on your interests, skills, and needs. Having a good foundation your first year at college is important: The kinds and numbers of courses you take in your first year can spell success or failure for your career as a college student.
3. *If you did poorly in math, build a basis of good learning skills before you take technical, math-based courses.* Allow yourself to make learning progress step-by-step. Don't take math-based courses—like chemistry—until you've adapted LTL skills to courses whose material is more familiar to you.



FINDING AND USING CAMPUS RESOURCES

In Your Words:

Finding and Using Campus Resources

Part of adjusting to college involves knowing where to look for help—*before* emergencies arise. Working with another student, use a campus map to locate key campus resources. Write their locations and a problem that might be solved by a professional at each campus resource.

1. Dean of Students' Office

2. Academic Dean's Office

3. Counseling Office

4. Academic Support Center

5. Library

6. Computer Center

7. Career Center



WHAT'S UNIQUE ABOUT YOUR COLLEGE OR UNIVERSITY

In Your Words:

Looking at Your Campus

Using your college/university's Handbook and Catalogue, as well as what you're learning from upperclass students, answer the questions below:

What is your college/university's main state purpose?

What are some of the important "rules of living" on your campus?

What do you think is most important about the college/university's history?

What are some of your *own* questions about your campus?

INTRODUCTION TO THE LTL JOURNAL

Learning is not only learning new information, or even applying what you've learned to new circumstances. It's also the ability to see the world around you in a new way.

When you acquire new skills, and respond in a new way, your goals and values change. New skills are new means; they may imply new goals. Suddenly something becomes possible that wasn't possible before. New goals force you to find new means to fulfill them. For example, if you begin a nursing curriculum, and perform extremely well in chemistry, your new skills may re-direct your goals: You may decide to prepare yourself for medical school. Your new skills are new means that can change your goals; in turn, they force you to find the means to accomplish your new goals.

We're in the midst of an information revolution, a rapidly changing world, where the central skill is to adapt to new circumstances, to learn *how* to learn. But much of formal education is still fighting for the ideals of the industrial revolution, of the factory, where it was important to master a routine. Thus, in today's high schools, students can often earn good grades through rote learning alone. Students are still asked to memorize the steps of a process, not to understand them.

With LTL, you'll build on your existing critical thinking skills, and acquire new skills. You'll become an *active* learner: You'll be someone with the ability to perceive problems and find the means to solve them. You'll acquire the key skill needed in today's technological society—the ability to adapt to changes in society and in the workplace. In this process, you'll develop your own view of reality, clarify your existing values, and find new directions. You'll question what you learn, break down new information into parts, re-examine it, see new possibilities, make new connections, and eventually stake out your claim.

As you work through this process, we'd like you to keep a journal. Start with where you are now—*what are your goals, your strengths, the areas which need improvement?* In each chapter of this book, as you acquire new skills, we'll ask you to reflect on the changes you see in your goals, and your view of yourself as a learner. Your new means may change your perception of what you can do, what you value, and what you hope to achieve.

This will be a journal of your own thoughts and feelings. Use what you're learning in this course as the basis for your thoughts. *What did you learn in this chapter that helped you this week—in and out of school? What messages are you giving yourself about your efforts, and your chances of reaching your goals?*

Don't worry about grammar and sentence structure. This journal is for you—to read and reflect on where you are now and where you want to be. Write as much or as little as you want.

Drop us a postcard. Or send us e-mail. Let us hear from you if you'd like to share some of your adventures in learning with others coming after you.

REACHING FOR THE TOP 1

A PRE-COURSE SELF-ASSESSMENT

Find out where you are now. Answer the questions on this inventory. Each group of questions reflects a chapter in this textbook. When you complete the inventory, score yourself and fill in the *Reaching For The Top* bar graph.

Be honest with yourself. You'll have a chance to see how far you've come by taking this inventory again and comparing your before and after *Reaching For The Top* charts. Rate yourself from 1–5 on each category below, with 1 = lowest and 5 = highest.

How We Learn

1. I know when and where I study best, and use this information to plan my study time.
2. I know if I'm a "big picture" or a "detail focus" learner, and have found ways to make up for what I'm missing.
3. I know if I'm a left- or right-brain learner, and use this information to study most effectively.
4. I know how messy or neat my optimal work environment is, and have set up my work environment to match my needs.
5. I know what the key barriers to my learning are, and have found ways to overcome them.

Generating Questions From Lecture Notes

1. I write my notes to the left of a 3-inch margin.
2. I record as much as possible, inserting * when I'm confused.
3. I generate questions from my lecture notes, making sure that I'm writing enough higher-level questions.
4. I write "What if...?" and Creative Questions about information I'd like to know about that was *not* mentioned in lectures.
5. I test myself on my lecture-note questions for 5 minutes every night.

Reading to Answer Questions

1. I write pre-reading questions and read to answer my questions.
2. I use my reading for self-testing.
3. I concentrate on math problem-solving questions when reading math-based material.
4. I use effective speed reading techniques.
5. I look for the distinctive "voice" when reading literature and poetry.

Time/Task Management

1. I have a good estimate of how long it will take me to do my school work and other work.
2. I break up complex tasks into manageable parts.
3. I take short, creative breaks.
4. I monitor my progress in completing major projects.
5. I map out a large task, and work backwards, ensuring that I have enough time to complete the task.

Preparing for Exams

1. I generate exam-type questions to prepare for exams.
2. I use visual organizers to prepare for exams.
3. I test myself when preparing for exams.
4. I have an effective strategy for taking objective tests.
5. I have an effective strategy for taking essay exams.

Writing, Research, & The Internet

1. I write well-constructed paragraphs.
2. I have an effective strategy for writing term papers.
3. I back up my written ideas with evidence.
4. I know how to do research using the Internet.
5. I know how to do research using an electronic card catalogue.

Being All That You Can Be

1. I am good at taking initiative.
2. I can see the positive side of things.
3. I have high self-esteem.
4. I have effective ways of helping myself overcome self-doubts.
5. I act in accordance with my values.

Relationships

1. I am good at making and keeping friends.
2. I feel confident in a romantic relationship.
3. My relationships are free of racism.
4. My relationships are free of sexism.
5. I act in an ethical way in my relationships with others.

Being Healthy

1. I use effective methods to reduce stress.
2. I eat in a healthy way.
3. I get enough exercise.
4. I have a responsible approach to sexual activity.
5. I am free from addictions.

For Adult Students: Going Back to School

1. I know where to find campus resources for adult students.
2. I balance school and work well.
3. I have an effective way to balance my responsibilities to school and my responsibilities to my spouse.
4. I have an effective way to balance my responsibilities to school and my responsibilities to my children.
5. I have an effective way to balance my responsibilities to school and my responsibilities to my employer.

Practical Matters

1. I know how to live on a budget.
2. I have an effective way to finance college.
3. When choosing my courses and extra-curricular activities, I take into account transferable skills.
4. I have a plan to establish a contact network.
5. I have clear career goals.

Where are you now.

Add up your total score. Your score on each category has a possible range of 5 (if you rated yourself 1 on each item) and 25 (if you rated yourself 5 on each item). Fill in the bar graph on page 15.

The next page shows a bar graph completed by one student, who rated herself as follows:

How We Learn: 12 points
Lecture Notes: 5 points
Reading: 10 points
Time/Task Management: 15 points
Relationships: 8 points

Writing, Research, & The Internet: 15 points
Being All That You Can Be: 12 points
Preparing for Exams: 10 points
Going Back to School: 12 points
Practical Matters: 8 points

Sample Pre-Course Self-Assessment

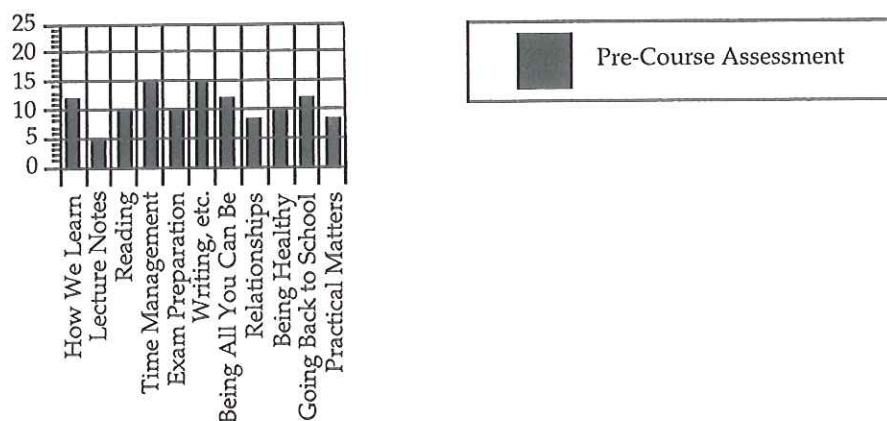
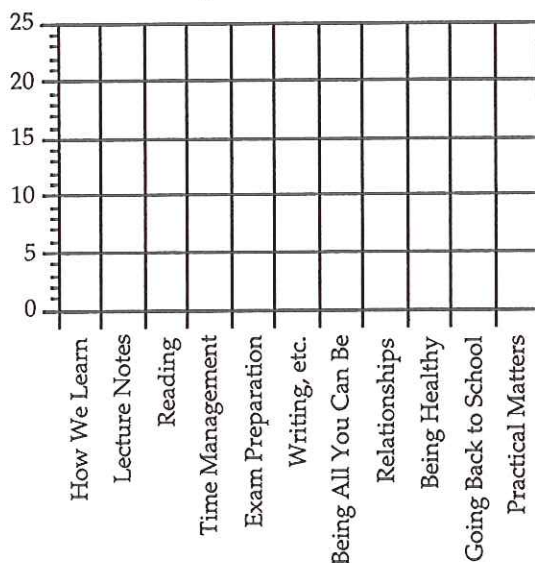


Chart the results of your own self-assessment here:



WHY ARE YOU IN COLLEGE?

In this chapter we've introduced some central issues you'll encounter as a college student: the benefits of going to college; achieving academic success with LTL; negotiating an unstructured curriculum; and meeting goals, both personal and academic.

Now that you're here, examine *why* you're here. The official reason for going to college is to learn. And it remains an important reason. But it's not the main motive for many people. *Writing in your LTL Journal, list the reasons why you decided to go to college.* Be honest with yourself. It's always good to be clear with yourself about what you're doing—even if you might later change your views.

At the end of this course, look back at this list. A semester of college will give you enough information to see what you've written in a new way. Are there changes in your reasons for going to college? If so, what are they?

Chapter 2:

CRITICAL

THINKING SKILLS

In this chapter, we'll help you begin to be aware of your best thinking skills—and show you some ways to sharpen your thinking.

You'll start by examining some barriers to learning, including both the fear of failure and the fear of success, learning disabilities, the pressures of time, relying on rote memorization, and the impact of peer pressure. You'll read about the dangers of too many extra-curricular activities, and of using a learning style that doesn't work for you. You'll begin to think about special problems encountered by adults returning to school. And you'll look at how you can overcome the limitations posed by these barriers, and work towards success.

In the next section of this chapter, we'll introduce you to the concept of *critical thinking skills*. You'll begin to see how becoming aware of how you think can help you think better. And you'll begin to think about your own best natural thinking strategies. Finally, we'll show you how you can consciously use the Four Learning to Learn® Thinking Tools to take a look at your own best learning skills.

Each person thinks and learns a little differently. In the next section, you'll look at the full range of *learning styles*: Are you a left- or right-brain learner? We'll preview some of the LTL skills here. In this book, you'll learn to *combine both inquiry and visual learning*. You'll learn to use both sides of your brain—improving your critical thinking skills along the way.

Do you focus on details, or are you a “big picture” learner? Do you need a structured, or an open-ended approach to learning? When and under what conditions do you learn best? In this section, you'll get a chance to evaluate your learning styles along these various dimensions.

Finally, you'll learn about the structure of learning—and how the key LTL skills are organized in that structure.

BARRIERS TO LEARNING

Before we talk about how learning occurs, let's explore some of the barriers to learning. If you recognize any barriers that prevent your best learning, we can help you devise strategies to work around them, so they no longer stand in your way. We won't suggest climbing the mountain straight up, facing it head-on; but finding a path *around* the mountain.

Fear of Failure

You may have experienced failure in the past and let it define you. If so, when faced with a new challenge, you put on armor—expecting failure from the start. You tell yourself, “No matter how hard I try, it won't work. Besides, if I really try, and fail, it will mean I can't succeed. Why try?” So you put up barriers—missing classes and appointments; staying up too late; “arranging” to fail before you try.

Getting around this barrier In this course you will learn a special set of new skills in the LTL system—skills that comprise the *most successful* learning system for college students. Read some of the **Student Voices** passages. Do these students remind you of yourself? *Try just one skill*—generating questions from lecture notes. See if it works for you right away—on your next test. When you see the results, try another new skill. You may have to get used to success.

Fear of Success

This may seem a strange kind of fear. Why would anyone be afraid of succeeding? But a growing body of research shows that many people *are* afraid of succeeding. Often this is because of conflicting expectations in society. For example, women have traditionally been care-givers. Until recently, women in our society have been expected to fill only the role of housewives—supporting the successes of their husbands. These expectations are rapidly changing. Fifty years ago, women comprised only 1% of a class entering medical school. Today nearly 47% of students entering medical school are women. But for *individual* women, the differing expectations may be very real and painful. The strength of long-held pictures people get of themselves in our society can produce internal conflicts, so that it seems easier to fail than succeed.

Fear of success can also occur when there are enormous stakes in success and failure. For example, if you are the first person in your family to go to college, you may feel a huge responsibility—one that can be a burden. You may also feel that, by succeeding, you will be entering a new world—and that your connections to the world you know will fade.

Getting around this barrier The stresses related to fear of success are all about developing a new self. It's scary to step out into a new world, and to begin to let go of an old image, building new dreams and a new sense of possibility. The first step is to acknowledge that fear: Anything new, even a wonderful change, is stressful. As you continue, you might give yourself new self “messages.” “Translating” negative self-doubt statements into positive ones can help you get past this barrier. In Chapter 9, “Being All You Can Be,” we'll give you models for how to translate negative messages of self-doubt—how to change negative feedback into positive feedback.

Learning Disabilities

For the last 30 years, a good deal of attention has been given to the problem of learning disabilities. There are both positive and negative effects of this attention. Increased school funding for students with learning disabilities has enabled more students to succeed. But there are also negative impacts—self-labeling which can lead to a special kind of failure: “*I don’t take notes because I’m an auditory learner;*” “*I can’t write because I have a writing disability;*” “*I can’t pay attention in class because I have Attention Deficit Disorder,*” etc.

Getting around this barrier LTL skills help college students at all levels. “A” students continue to do well in school—but spend less time studying. Students who have never done well academically have sudden and continuing success. But the LTL system has a special impact on students who have been diagnosed as learning disabled: It opens up the “prison” doors and dissolves some of the most stubborn academic disabilities. (For example, you will no longer have to tape lectures and listen to them over and over. The LTL question-generating note-taking process will free you from that chore.)

Pressures of Time

Many people have multiple responsibilities these days. But there are still only 24 hours in a day. One (not very effective) way of coping with the pressures of time is procrastination—to put off until tomorrow what you could do today.

What kinds of tasks are most often put off until another day? The big, complicated ones that loom ahead in the distance, and seem to grow larger with each passing day—like writing a term paper, or doing your taxes.

People also find it hard to schedule time for ongoing tasks, like finding 2–3 hours each week to read a chapter in a biology textbook. Why is it so hard to schedule this time? Because life breaks in and plans break down, interrupting the most “perfect” schedule.

Getting around this barrier With LTL, you’ll learn a new approach to dealing with time, not to try to devise and stick by a rigid schedule—but to focus on *task* management. You’ll begin to break up large tasks into manageable parts that fit into life as it actually is—with its unexpected emergencies and interruptions.

My story

I was a classic learning disabled child. When I entered school, I had a lot of curiosity, a larger-than-average vocabulary, and great expectations for learning.

But I couldn’t learn to read. I could “get” some distinctive words, like “elephant”, but the letters in all the small words seemed mixed up. I was a “mirror reader.” For example, I could not tell the difference between “d” and “b” and could not scan words from left to right. I kept changing the direction of where and how I looked at words on a page, sometimes from left to right, sometimes from right to left.

I struggled like this for several years, feeling confused and frustrated at why I could not do what seemed to come so easily to other children. I was placed in special classes, and received lots of help, but nothing seemed to work. When I was nearly 10, entering the 5th grade, everything changed for me. I had a wonderful teacher, Mrs. Mildred Kelly, who seemed to know what to do—and it worked. Within a few months, I became a reader. A real reader—who read everything, and found a door open to a new world.

Did I “recover” from my disability? In most ways, yes. I have graduate degrees from Harvard and the University of Michigan, and am respected in my field. But I still have trouble telling left from right; get lost easily; and have a terrible sense of direction. Using new learning skills, I found a way around the most important barriers to my success. And getting lost? Well, I find my way around town by looking for private landmarks, instead of depending on my own internal compass.

In graduate school and in 15 years as a college learning center director, I looked for a systematic way to teach what I learned from Mrs. Kelly to my students. Working with Joshua Slomianko, I found that way: Learning to Learn® has been recommended by the U.S. Department of Education as the most effective learning system for college students. My mother said, “You were a kid who had a hard time learning! And now you’re teaching people how easy it is to learn.”

—Dr. Marcia Heiman, co-author,
Learning to Learn®
Thinking Skills For The 21st Century

Relying on Rote Memorization

Most students see school learning as different from other kinds of learning. Why? Because school is one of the few places where you have to *memorize* to get ahead—because school is a closed environment. “Cramming” for exams is a time-honored custom: You memorize tonight what you forget tomorrow—*after* the exam.

The problem is that rote memorization is difficult, boring—and not very effective. Even using a memory system which teaches you “tricks of the trade” may not work—even for short-term memory (the kind of memory needed to recall information the morning after a night’s study). For example, suppose you’re studying for a history exam. As a memory device, you make up a nonsense word, where each letter stands for one of the 10 terms of a treaty. You’ll probably remember the word. But under the pressure of an exam, you might get confused or forget what the letters stand for!

But even if rote-memory “tricks” work for you, their use is limited and cumbersome beyond tests asking for definitions of terms. In college, you’ll be expected to do more than “Define X.” You’ll be asked *higher level* questions. If you rely on rote memorization, you’ll have the added problem of trying to “translate” from the memorized pattern to the pattern of the questions asked by the field.

Getting around this barrier With LTL, you’ll learn to use *questioning* and *visual learning* methods in an active way. Your new skills will help you think of what you’re learning in terms of the *questions* raised by the fields you’re studying—the kind of thinking you’re expected to use on exams. LTL skills rely on *natural learning skills* used in open environments—skills that help you recognize faces and places, cook a meal, drive a car, or play basketball.

Peer Pressure

In high school you may have been reacting to another barrier to learning. Social pressures are serious in high school, when teenagers are just beginning to establish their own identities. On one hand, teenagers want to establish the boundaries of the self. They want to be unique. But the power to assert their uniqueness can only be achieved by joining others in similar situations with similar interests.

For many teens, establishing an identity involves doing exactly what authorities—parents and teachers—do not want them to do. Part of teen rebellion is asserting yourself and fitting in. If your group rebels against instructions—and instructors—there may be pressure to put down academic achievement as something only for “nerds.”

Now that you’re in college, you might find that your priorities have changed. But you face two obstacles. First, your self-image is at war with the image of what a “good” student is. (Is it cool to get good grades?) Second, you’re out of practice—and you don’t have the right skills. You’ve never learned how to study, and college is a lot more academically demanding than high school.

Getting around this barrier Part of your problem will take care of itself in a new context. Now that you’re in a new environment, things will start to sort themselves out. Research on human behavior change shows that a change in social context creates conditions where new habits can be formed. Make sure that your new friends are serious about college and what it can help them achieve. New friends who are motivated to do well can create *positive* peer pressure for you to succeed.

Applying the LTL methods to your content courses will make up for your lack of experience in learning how to learn. You'll predict exam questions, develop good learning habits, and do well in school.

Extra-Curricular Activities

You may be in college for extra-curricular reasons—you're planning to be a basketball superstar; you want to "party" away from home; you liked the non-academic side of high school—belonging to clubs, school organizations, sports teams. You see college as a new kind of amusement park. This can become a barrier if it means that you ignore your academic work.

Getting around this barrier It's true that there's a strong social side to the college experience. And academic success may seem a low priority to students on sports scholarships. But don't miss the chance to shape the rest of your life by focusing on the non-academic side of college life. A low GPA may mean that you're suspended from the team; or you might lose a valuable scholarship. And what's more important, you're forfeiting the rest of your life: You'll miss gaining new skills and finding new goals.

If extra-curricular activities are important to you, and you want to *add* them to your college work, try the LTL Task Management strategies (Chapter 5). They'll help you do more in less time.

Using a Learning Style That Doesn't Work For You

If you're not learning in a way that comes natural to you, you may face obstacles to learning. You'll find out about learning styles later in this chapter—and you'll get a chance to find out what your optimal learning style is. For the moment, think back on any learning situation—in school or out—where there was a very poor learning "fit." It may be that your acquired learning habits are at variance with your own best, natural learning style.

Getting around this barrier Using the self-assessment on page 40 ("What is Your Learning Style?"), find out your own pattern of learning styles—and make changes that fit your learning needs. For example, if you're a visual learner, you may want to take courses where your visual skills are at a premium. If you're a detail-focus learner, a pre-law curriculum might fit your needs. If you're a night person, try to avoid early morning classes.

Problems of Adults Returning to School

As an adult returning to school, you face many obstacles to learning. You've been out of school for a long time, so your learning skills are rusty. You have many responsibilities—perhaps a family and a job—and doing *everything* is a constant juggling act. And you might face a certain amount of resistance from your family and co-workers, who know and appreciate you as you have been, and who are uncomfortable with surprises.

Getting around this barrier Chapter 12, "Going Back to School," is devoted to helping you solve the special problems you face as an adult returning to school. For the moment, you should know that, despite the barriers, adults returning to school have a very high rate of success in college. With your added maturity, clearer purpose and goals, you have many advantages over younger students.

USING YOUR BEST THINKING SKILLS

What are “critical thinking skills?” They are the thinking skills which are most important to good learning. They involve active learning, being aware of—and using—your best natural thinking skills, and weighing both sides of an issue before taking action or making a decision. As with any other skill—learning to play tennis or learning to cook—you’ll get better with practice. Not only that: Developing the habit of thinking *about* thinking—being aware of the strategies you are using to learn and evaluate information—will help you develop better critical thinking skills.

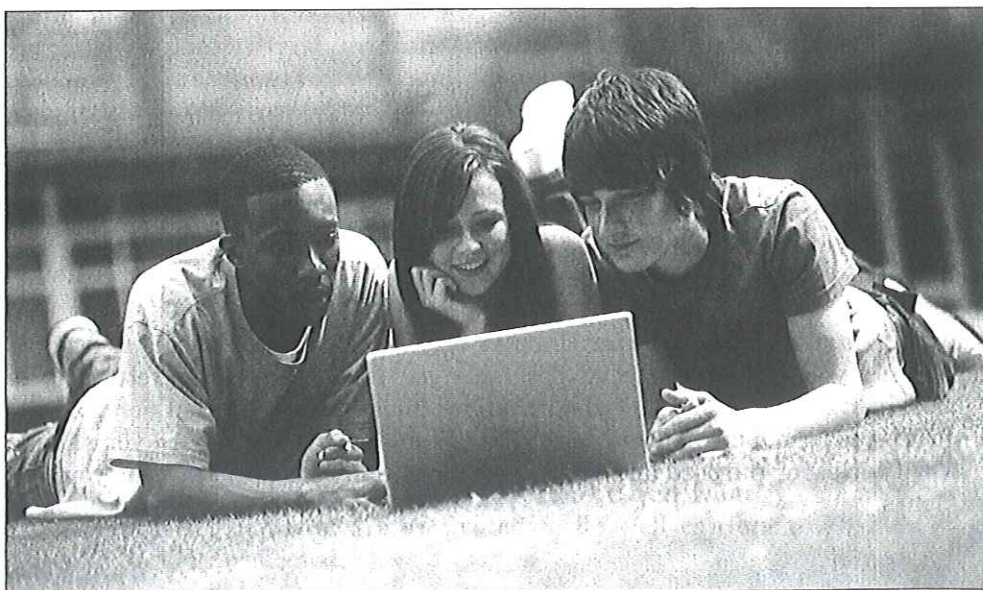
The Active Mode

Think about how you think when you’re doing something you’re good at—anything from playing pick-up basketball to playing chess. You try out a strategy—and see if it works. You look for clues—and find ways to use them. That is, you experiment, take feedback, and internally ask yourself questions about what’s working.

This kind of *active thinking* is harder when the information is new to you—for example, when you enter a biology laboratory for the first time. At first, it *all* seems new to you. You’ve never been in a lab. You don’t know where to start. You’re afraid of making a mistake. You can’t fall back on tried-and-true strategies, and you’re not sure how to tell if you’re going in the right direction.

If all this seems too much for you, and you “turn off” your mind, you’re not thinking critically. But if you begin to call on your own experiences, things will settle into place. For example, imagine you calm down and recognize that the lab is a kind of “kitchen”—and you like to cook. You begin to look at your lab manual as a kind of cookbook. You arrange what you need—just as you do when you’re working from a recipe. Since you’ve found a way to connect something new to skills you already have, you can begin thinking critically again—asking yourself questions about what you’re doing, looking for clues that you’re on the right path, checking what you’ve done, making small corrections, then asking yourself more questions about where you are and what you need to do.

You’re using *active thinking skills*.



Your Best Natural Thinking Skills

Many of the barriers you face as a new college student can be overcome by learning to use your existing assets—your own best thinking and problem-solving strategies. You'll learn to do that in this course—applying learning methods based on *natural* thinking skills. These strategies will help you become an *active learner* and a successful student. They'll also help you solve personal problems and meet personal goals.

The Four Learning to Learn Thinking Tools

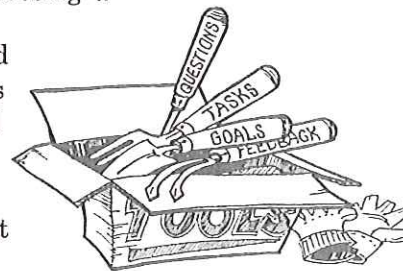
Research shows that most successful learners use a combination of four strategies, or "Thinking Tools." As a successful learner, you would:

- ◆ **Ask questions**—asking yourself questions about new information
- ◆ **Break tasks into small, manageable parts**—to help you get things done
- ◆ **Focus on goals**—setting and achieving small and large goals
- ◆ **Get feedback on learning progress**—finding out what you know—and what you need to know

Thinking Tools for Academics and Life

These Four Thinking Tools are not just academic skills. They are skills you use every day—usually without being aware of them. For example, crossing a street in traffic involves using all four of these thinking tools. Crossing a street:

- ◆ You ask yourself *questions*: "How far away are the cars and how quickly are they traveling? Will I make it safely across the street if I cross now or should I walk to the corner and cross at the light?"
- ◆ By asking yourself questions, you're *breaking a complex task into smaller parts* and finding the most important aspects of the situation.
- ◆ Your behavior is *goal-directed*: You want to get across the street.
- ◆ You have to pay attention to *feedback*—or you might get hit by a car.



If you *consciously* use these four thinking tools—especially in areas where you were on "automatic pilot"—you'll be surprised at what happens.

Becoming Aware of Your Own Best Thinking Strategies

We've said that thinking tools of successful learners are the same as the skills you use in every day life.

Since you use the Four LTL Thinking Tools on a daily basis, they are *natural* to you. Thinking is one aspect of *doing*. In this book, you'll learn how to make active thinking more *present* in your academic life. You might forget some of the steps in this book—in fact, we encourage you to be flexible, inventive, make changes—and build new learning strategies with these four thinking tools. The gains resulting from this process will be lasting—because *we're not teaching you anything new*. We're helping you *externalize* your own natural thinking—so that you become aware of and have access to your own best thinking skills.

In Your Words:

The Four LTL Thinking Tools

You may already be using some of these strategies in many areas of your life. The following exercise asks you to look at how you currently use this way of thinking. When you see that you are *now* using these Thinking Tools to accomplish things you do well, it will be easier to see how to use them to learn something new.

Think of an activity you do well—a hobby, like fixing cars, gardening, playing pick-up basketball, painting, cooking—whatever is in your life.

Name your activity. Then list some of the things you do when you perform this activity. (Remember, this exercise will help you see how you *now* apply these strategies to an activity you're good at. No one will judge you on your answers.)

Evaluative Thinking

The Four LTL Thinking Tools will help you learn new information better. But good thinking and learning in and out of college involves more than acquiring new information. You'll need to look at both sides of an issue and weigh them before coming to a conclusion.

Try this exercise with a friend: Take an issue that you both feel strongly about. Working with your friend, list both sides of the issue—regardless of how you feel about the issue now. This practice isn't about changing your views. It's about *sharpening your thinking*.

Asking Questions

How do you use this Thinking Tool when you perform your chosen activity? Write your answer in the space below.

Hints: How do you find the information you need to do your chosen activity? What questions do you ask yourself before beginning your activity?

Breaking Complex Tasks into Manageable Parts

How do you use this Thinking Tool when you perform your chosen activity? Take three minutes to write your answer in the space below.

Hints: Do you break your overall goal into sub-goals? What are the parts of this activity? Where are your stopping places? If two people were helping you, what would you tell them to do? When you perform this activity, what do you do first? What do you do next?

Focusing on Goals

How do you use this Thinking Tool when you perform your chosen activity? Take three minutes to answer below.

Hints: What do you do to keep your mind from wandering? How often do you think about reaching the intermediate goals of your chosen activity? Do you remind yourself of the overall goal of your activity? What are the rewards of this activity?

Getting Feedback on Progress

How do you use this Thinking Tool when you perform your chosen activity? Take a few minutes to answer below.

Hints: Are you getting closer to accomplishing your overall goal for this activity? How can you tell if things are going well? How do you know if you're doing a good job? Can you tell when you're going in the wrong direction?

Empower Yourself

Solving Problems

With The Four LTL Thinking Tools

You already use the Four LTL Thinking Tools when you perform activities you're good at—but probably without being aware of them. They're a natural part of the way you think. With LTL, you'll become more aware of your *naturally occurring thinking skills*. The Four LTL Thinking Tools are the basis of LTL. Throughout this course, we'll add skills which show a variety of ways of using these thinking tools.

When you encounter a problem at school, at work, or in your personal life, think it through, using the Four LTL Thinking Tools.

1. *Ask yourself questions.* What is the problem? Have I ever seen this problem before? Is it similar to a problem I know how to solve?
2. *Divide the problem into parts.* What are the parts of the problem? Do I know how to solve part of the problem? Do I need more information to solve other parts? Can I find a solution by putting the parts in a different order?
3. *Work towards specific goals.* Do I have a clear picture of the outcome I'm looking for? Can I work backwards from that goal—dividing the problem into parts and asking myself questions along the way—to find a solution?
4. *Get feedback on your progress.* Is there a way I can check to see if I'm going in the right direction? Do I know where I am in the process? Am I achieving my objectives along the way to my overall goal?

All of these strategies are interrelated. Once you've gone through these steps, begin again by asking yourself new questions, finding new parts of the problem and its solution, and using new information. The new information may call for a revision of your checklist. You have a sense that you're moving forward. You're progressing to new levels of activity. In fact, you're re-creating yourself. You're evolving, developing new ways of coping. For example, when you get feedback on your progress, you might decide to revise some of your smaller goals. You might change your direction, and commit more resources; set aside more time; change *how* you do things as well as *what* you do.

If you haven't found the solution, re-cycling will help you find it. If you *have* found a solution to your problem, move forward: How can you apply this solution to other problems?

Adding Evaluative Thinking—Finding Alternatives

As a further practice, look for two separate paths, two different solutions to your problem. List and weigh them. Which is more promising? more possible? Being aware of alternatives will help you think more clearly and act less impulsively.

Using these skills, you'll not only solve the problem at hand. You'll also *predict problems and find solutions for the future*. More importantly, you'll develop new skills, find new strengths, and have more confidence to tackle new challenges.

In Your Words:

Solving Problems With The Four LTL Thinking Tools

Working with a partner in your class, identify a problem you both often face, and apply the Four LTL Thinking Tools towards solving that problem.

Do your work here:

✓ THINK ABOUT THIS

In the past you've used the Four LTL Thinking Tools without being aware of them. The next time you're working on a project, and get "stuck", try these Thinking Tools. Notice their effect. Use them to think through and solve your problems. You'll become more aware, more conscious, and better able to successfully accomplish what you set out to do.



Student Voices

Eddie Cole

Learning to Learn? I think it's great. I just wanted to play ball and become a pro. I was on probation before LTL. I was kind of down and out. I didn't even want to take LTL. But once I got into it, it really changed things for me. Now I can get A's and B's, even in hard subjects. With all my questions, I know what's going to be on my tests and I don't even have to study too long.

I learned that there's more to life than basketball. I'm a computer science major now, and I'm doing pretty well. When I finish this degree at the community college, I'm going into business management at a four-year college.

What would I tell another student about LTL? It will change their life.

LEARNING STYLES

What Are “Learning Styles?”

Different students learn in somewhat different ways. Some students are more analytical, others more holistic in their approach to new information; some learn better when working independently, others require direction. Time of day may be a factor: “Night” learners burn the midnight oil; “morning” learners feel most awake and aware early in the day. We’ll explore these and other learning style issues in this section—and you’ll get a chance to determine your own learning style—what comes naturally to you. You might be a more visual than auditory learner; or one who benefits from a certain environment, more or less crowded, more or less noisy, than the norm.

DIFFERENT KINDS OF LEARNING STYLES

- ◆ Are you mainly a verbal (left-brain) or a visual (right-brain) learner?
- ◆ Do you naturally focus on details? Or do you have a dynamic, changing focus, looking for the “big picture?”
- ◆ Are you comfortable in a highly structured learning setting? Or do you need a more open environment?
- ◆ Do you learn best in the morning or at night? Before or after food? Can you do certain kinds of learning better at some times than others?

You might think that certain combinations naturally go together. For example, do you think that all artists—visual, creative learners—are also “big picture” learners? Do you believe that all scientists are verbal, logical thinkers—instead of non-verbal, visual learners?

If you think those things, think again.

The painter Georges Seurat had a strong *visual imagination*. But he constructed his paintings as several thousand points of color, each reflecting slight changes in the light on the figures and landscapes he painted. So he was *very focused on details*. But he was *not a high-structure learner*. Most of his paintings were done outdoors, where he could control little or nothing of the changing view.

And the scientist Albert Einstein may have had a primarily *visual imagination*. His most important discoveries began with complex, highly visual thought experiments—like daydreams very well imagined in the mind’s eye.

We’ll explore some of these areas on the following pages.

LEFT- AND RIGHT-BRAIN LEARNING STYLES

Why do people have different learning styles? The structure and function of the brain can explain some of these differences. The brain is made up of two sides—the left cortex and the right cortex. These two sides are connected through a complex network of nerve fibers. The two sides of the brain control different kinds of mental activities.

In most people, the left cortex controls **logic, reasoning, words, and numbers**; the right cortex controls such mental activities as **imagination, pattern recognition, color, and daydreaming**.

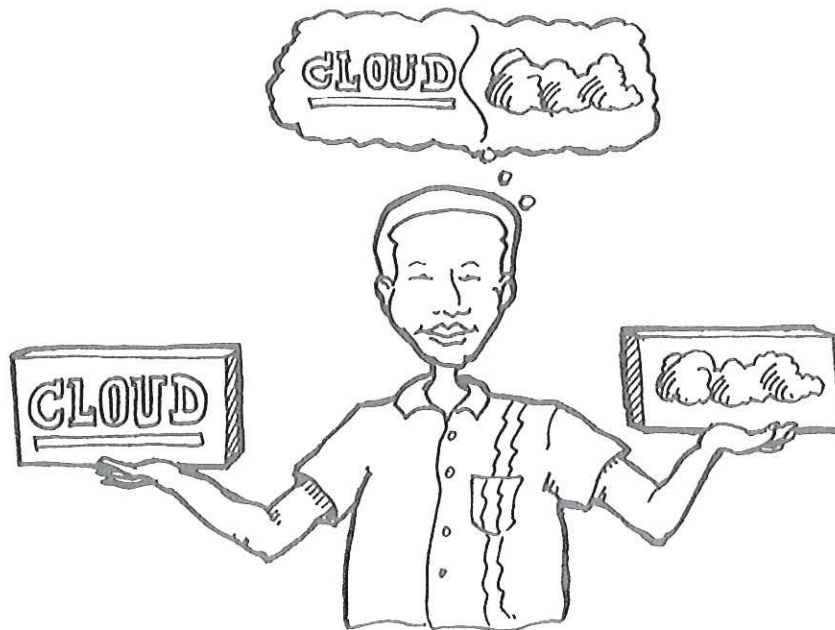
Many people are clearly left- or right-brain dominant. For example, George Washington and the Greek philosopher Aristotle were left-brain dominant: Their thinking was logical, rule-governed, internally consistent, and verbally based. In contrast, it appears that the painter Marc Chagall and the dancer Isadora Duncan were primarily right-brain dominant.

You may be a person with a strong visual imagination. If so, you may have found school to be frustrating in the past. You may have felt that you didn't fit into the structure of what was required in school. That's because you have a *different learning style*. You may be *right-brain dominant*.

But you still have to operate in the logical, left-brain world.

Or you may be highly verbal, but unable to “get” fields like physics, where strong visual learning skills are important.

The good news is that you can learn to effectively use *both sides of your brain*. Research shows that it is possible to strengthen the non-dominant side of the brain—and that doing so enhances the functioning of both left and right cortexes.



Using Both Sides of Your Brain

In this course you'll learn how to be more aware of and use your natural thinking skills. You'll learn to integrate and strengthen both sides of your brain through the LTL exercises.

LTL and Left-Brain Learning

You'll learn to generate questions from lecture notes and readings. The questioning process is a kind of mental exercise that strengthens the left side of your brain. **Generating questions** from written material (Chapter 3) will help you (1) think clearly through complex issues and (2) externalize your thinking, so you can examine what you think about both new and old information.

For example, here are some lecture notes and a Mirror Question that directly reflects the information in the notes:

*How does teamwork
help employees become
more productive?*

*Teamwork increases productivity by (1) pooling
information and problem solving; (2) helping
employees learn from each others' experiences;
(3) decreasing down time.*

Here's a Mirror Question generated from key words in two textbook headings:

*What is the Hazard.
Communic. Standard,
what does it require of chem.
manuf. employers?*

Improving Workplace Safety:

The Hazardous Communication Standard

The Hazardous Communication Standard (HCS) is designed to protect workers from the safety hazards involved in working with chemicals. The HCS law now affects every manufacturing company using chemicals.

HCS Requirements of Chemical Manufacturers

According to HCS, chemical manufacturers are required to meet special standards. They must let their workers know about hazards by using (1) special labels and (2) Material Safety Data Sheets.

All safety hazard labels must have 6 parts: They state the name of the chemical; the name, address, and emergency phone number of the company that made or imported the chemical; the physical hazards involved (Can it catch fire? Is it radioactive?); important storage or handling instructions; health hazards (What illnesses can it cause?); and basic protective clothing, equipment, and methods for working with this chemical.

LTLE and Right-Brain Learning

When you construct Question Charts and Key Word Diagrams (Chapter 6), you'll be combining verbal and visual skills.

Question Charts

Question Charts will help you compare and contrast complex information—arranged by questions—in visual form:

*How have new policies
prevented workplace accidents?*

*New
Policies:*

*Employee
decision-making*

*Improved
communication*

*Less demanding
shifts*

<i>What are some benefits of the new policies?</i>	<i>Employees take action in a crisis</i>	<i>Information flows easily between employees at all levels</i>	<i>Employees are alert to dangers</i>
<i>What are examples of accidents avoided by this policy?</i>	<i>Navy deck worker can halt operation if something is wrong when air strike is launched</i>	<i>Air controller-pilot communication resulted in 10-fold decrease in accidents since 1960s</i>	<i>Diablo Canyon nuclear power plant has excellent safety record</i>
<i>What is an example of an accident that might have been prevented by this new policy?</i>	<i>1986 Challenger disaster (NASA management did not listen to warnings of engineers)</i>	<i>Air Florida DC crash in 1982—junior officer did not give needed information to airplane pilot</i>	<i>Exxon Valdez oil spill</i>

Key Word Diagrams

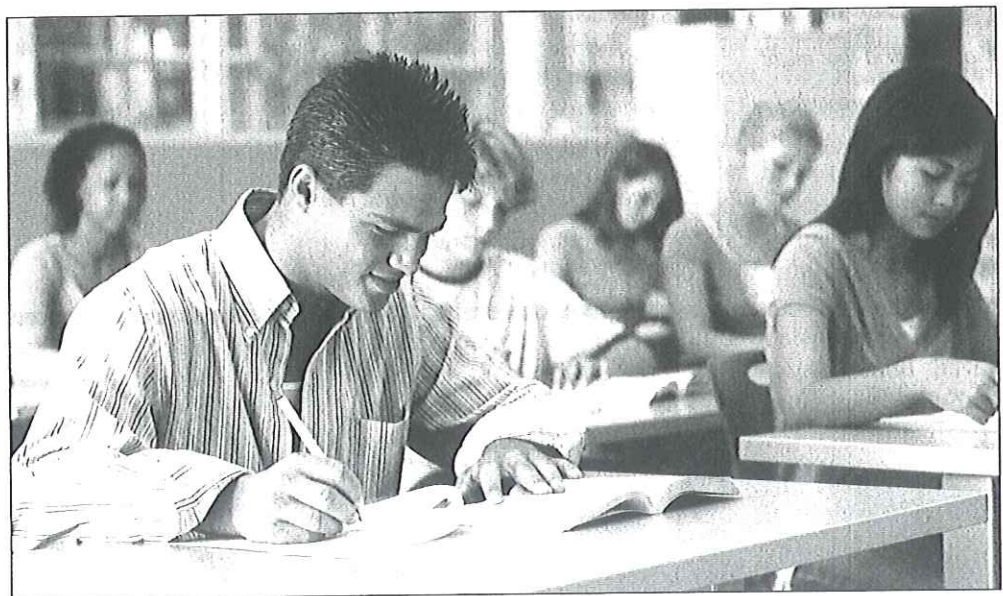
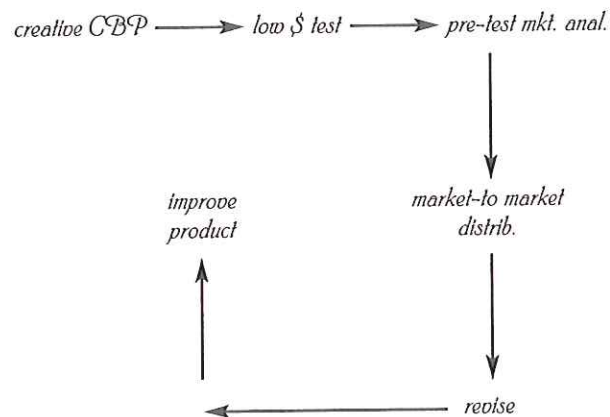
Key Word Diagrams (Chapter 6) will let you draw any kind of diagram to connect ideas abbreviated into key words. Like Question Charts, Key Word Diagrams will help you combine verbal and visual thinking skills.

Here are two examples of Key Word Diagrams that answer questions:

"Should the government help large companies that may fail?"

<i>Pro</i>	<i>Con</i>
<i>-safeguards workers' jobs</i>	<i>-may encourage poor business practices</i>
<i>-high costs of unemployment</i>	<i>-goes against idea of free market</i>
<i>-increases gross national product</i>	
<i>-costly federal "rescue"</i>	

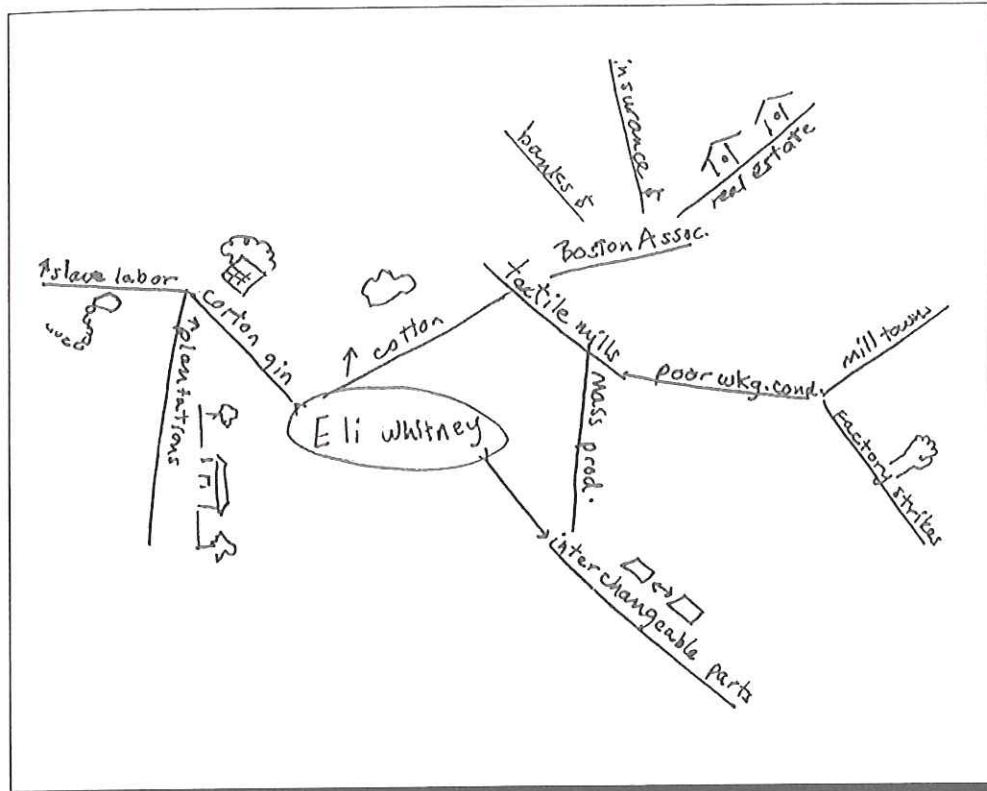
"How can small businesses use creative testing of new products to compete with large corporations?"



Mind Maps

Mind Maps (Chapter 6) can help you “see” your thinking. Starting from a central picture that represents the topic of the Mind Map, you’ll draw lines and small pictograms radiating out of that key idea.

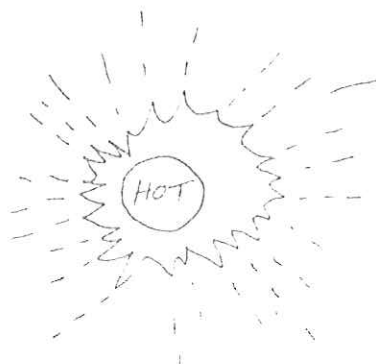
Here’s a Mind Map that summarizes the effects of Eli Whitney’s work:



Picturing Ideas

Picturing Ideas (Chapter 6) lets you draw a simple picture to recall technical ideas. For example:

Radiation is the traveling or transference of heat from an object directly into the air.



Integrating left- and right-brain thinking

All of these visual organizers will help you integrate verbal (left-brain) and visual (right-brain) thinking.

If you're mostly a left-brained learner, question-generating will be easy for you. Drawing a diagram of the possible consequences of changes in an event will strengthen your visual learning skills. If you're mostly a right-brained learner, constructing visual organizers will be easy for you. Constructing your visual organizers as answers to questions will help strengthen your verbal learning skills.

LTL will give you practice with "left brain," analytical thinking and "right brain," creative expression. After awhile, you won't view LTL as a set of separate skills. Instead, you'll see all the LTL skills as variations of two central practices: *generating questions* and *breaking down ideas and tasks into manageable parts*. As you become more familiar with the LTL skills, you'll "play" with the ideas presented in your classes and assignments: You'll make *variations* on assigned problems, ask yourself *questions* that were raised—but not necessarily answered—by the material, and construct visual organizers that show the relationships between apparently unrelated ideas and facts in your courses.

Unlike study skills, which lose their effect after you stop explicitly using them, LTL will become part of your thinking process. You'll see LTL as a fourth basic skill, reasoning, which helps you acquire and have mastery over the other three.

✓ THINK ABOUT THIS

Natural thinking skills

Think of how well you drive a car—you're taking in and responding to visual signals at a very fast rate. It's like a speeded-up question/answer activity, where you're quickly looking for and responding to feedback around you. All of this is a kind of *internal question-asking*. In the LTL questioning exercises, you'll learn to slow down a bit and make that internal question/answer more obvious to you. By putting those thoughts into words, you'll *externalize* your thinking—bringing your thoughts into the light of day, where you can examine them more closely.

DETAIL-FOCUS/BIG PICTURE LEARNING STYLES

Detail-Focus learners are good at analysis, seeing the parts of an item or event. In the workplace, they tend to be good administrators. Detail-Focus learners get things done, and done the right way; but they may have trouble with “the vision thing.” They may see the trees so clearly that they don’t notice the whole forest.

In contrast, Big Picture learners understand the importance of working towards a large, perhaps unreachable, goal. Big Picture learners tend to be visionaries, people who want to make changes, who see things in an unconventional way. The problem is that Big Picture learners may not be practical enough to see the details needed to make their dreams come true.

So whether you’re naturally a Detail-Focus or Big Picture learner, you’re more likely to reach your goals if you develop some skills from the “other side.” The LTL skills can help you become a more “balanced” learner.

If You’re a Detail-Focus Learner...

Questions that begin with “How...?” “Why...?” and “What if...?” (Chapter 3) will help you think broadly about a topic. In finding the answers to these questions, you’ll go beyond the precise detail of “What is...?” Questions, which usually reflect only simple facts. (“*What is the temperature outside?*” “*What is a ‘photoautotroph’?*”)

Your questions can lead to a chain of related questions. They can also produce a kind of creative tension, since their answers may take some time to find—and in some cases, the answers may not be available. If you’re a Detail-Focus learner, you naturally think of “How...?” “Why...?” and “What if...?” Questions when you’re focused on step-by-step work. But you may ignore these kinds of questions when you’re looking at the project as a whole. Also, as a Detail-Focus learner, the open-ended quality of asking these “How...?” “Why...?” questions may bother you. Or you might ask *too many* “What if...?” Questions. You might be too cautious, and let “What if...?” Questions keep you from acting on a problem.

Solutions are often found during the period of creative tension evoked by “How...?” “Why...?” and “What if...?” Questions; not everything must be answered *now*. As an **exercise**, you may want to write more “How...?” and “Why...?” Questions about a problem you’re trying to solve. Leave the questions unanswered, and come back to them in a day or two.

In Your Words:

Asking Detail-Focus Questions

Think of an important goal you want to accomplish this year (academic, personal, social, or work-related). Write some questions starting with "What is...?" "When...?" "Where...?" and "Who...?" about what you need to do to reach this goal.

If You're a Big Picture Learner...

If you're a Big Picture learner, you'll welcome the open-ended quality of "How...?" "Why...?" and "What if...?" Questions. In fact, asking these kinds of questions is a *natural thinking skill* you use when you're thinking about projects you enjoy, on or off the job. So it will be easy for you to be aware of "playing" with these questions as problem-solving tools. But you may overlook the details within the big picture. As an **exercise**, you may need to focus on asking questions that reflect simple facts, like "What is...?" "When...?" "Where...?" and "Who...?"

In Your Words:

Asking Big Picture Questions

Think of an important goal you want to accomplish this year (academic, personal, social, or work-related). Write some questions starting with "How...?" "Why...?" and "What if...?" about what you need to do to reach this goal.

HIGH AND LOW STRUCTURE LEARNING STYLES

Another category of learning styles is High and Low Structure. High-Structure learners are very organized, and enjoy learning in organized settings. Low-Structure learners are just the opposite.

If You're a High-Structure Learner...

If you're a High-Structure learner, it's important to find ways to give structure to your learning when you work on your own—so you don't lose your way and waste a lot of time. You also need a quiet work setting, where there are few distractions.

Setting specific goals for yourself with a Task Management Checklist (Chapter 5) will help you build structure into unstructured time.

Asking yourself questions will help focus your learning. Asking questions will help you study in a self-directed way. Getting into the habit of asking yourself "How...?" "Why...?" and "What if...?" Questions will give you more structure as you work and learn.

If you're a High-Structure learner, you may find that Mirror Questions come easily to you, but you need to work on asking "What if...?" Questions whose answers are open-ended.

If You're a Low-Structure Learner...

You may be the kind of person who hates to work in a structured environment. Only you can find your papers—but you know where they are. You like to lean back, put your feet up on the desk, and think about solving a problem. You enjoy working and learning on your own, in a low-pressure setting. You can deal with noisy environments; you may even find that you can learn when there's noise—like TV in the next room—that would distract someone else. You can concentrate in a visual or aural mess—focus in and be unaware of chaos around you.

But there's a down side. You may be so unaware of what's going on around you that you daydream.

If you're a Low-Structure learner, questioning skills will keep you from wool-gathering. Asking yourself "How...?" "Why...?" and "What if...?" Questions will help give you direction.

You also need to give yourself concrete **feedback** on your progress to keep moving in a productive direction. How can you do this, and still not be boxed in by rigid goals?



In Your Words:

Productive Environments For High- and Low-Structure Learners

Working with another student, picture optimal working environments for a High-Structure learner and a Low-Structure learner. In what ways would these environments be different? How would they be similar? Are there any differences in how each should apply the Four LTL Thinking Tools? (For example, students with a high need for structure would naturally use more goal-setting and looking for feedback; people with low structure may ask themselves more questions about an activity.)

Write key words describing optimal learning conditions for both types of learners:

High-Structure Learner	Low-Structure Learner
Figure 1: High-Structure Learner	Figure 2: Low-Structure Learner

WHEN DO YOU LEARN BEST?

Is there a time of day when you learn best? Are you a morning person? Night person? Do you learn best after food? Or does eating make you sleepy?

Do you read best in the morning, just after a cup of coffee? Or is your mind going too fast to slow down and comprehend new information then? If so, is your “fast mind” period the best time for your writing?

Does being hungry make you generate a lot of ideas—so that you write well then? Or does hunger interfere with your clear thinking?

Is there a time of day when you can best read fiction (lighter reading) or biology (heavier reading)? Or is it best for you to alternate this reading—light/heavy/light?

Take some data. What happened just before you really studied well for a math test? Did solid homework in a biology class? Understood poetry? Wrote clearly and well? Look at:

- ◆ *the time of day;*
- ◆ *what happened just before your “breakthrough;”*
- ◆ *the surrounding aural/visual distractions;*
- ◆ *when you last ate; and*
- ◆ *other special conditions surrounding your learning.*

That is, you’re more than just a “morning person” or a “night person.” If you take data on when you do your best work—your best work in different areas—you’ll have a better picture of when *you* learn best.

How does the concept of The Four Thinking Tools fit the theory that people have different learning styles?

Everyone uses these four skills in thinking and problem solving. With the LTL skills, you’ll learn to *integrate* all four thinking tools: You will build on the learning styles you now use well—and strengthen the areas you need work on. For example, if you are now primarily a right-brain, visual learner, you’ll learn to build on that skill, and strengthen your left-brain, verbal learning.

WHAT IS YOUR LEARNING STYLE?

Circle the items you'd mark "Yes."

Left-/Right-Brained Learning

1. When someone gives you directions, can you "see" where you're going in your mind's eye? If you write down the directions, do you draw a little picture or diagram for yourself—perhaps with arrows?
2. Do you look for a logical "system" to complete a project?
3. Do you often understand a situation before you can put what you've seen into words?
4. Do you often need a reason *why* before you do something?

Detail-Focus/Big Picture Learning

1. Is your checkbook usually balanced?
2. Would you feel comfortable if you turned around in a circle, and saw huge mountains as far as you could see in all directions?
3. Do you plan vacations carefully?
4. Do you have big dreams—but don't know how to make them real?

High-Structure/Low Structure Learning

1. Is your desk usually neat?
2. Was your mother always after you to clean up your room at home?
3. Do you usually study in the same place?
4. Do you break rules because you forget what they are?

Key

Left-/Right Brained Learning

You're probably left-brain dominant if you circled 2 and 4.

You're probably right-brain dominant if you circled 1 and 3.

If you circled other combinations, you don't have a clear dominance pattern.

Detail-Focus/Big Picture Learning

You're a Detail-Focus learner if you circled 1 and 3.

You're a Big Picture learner if you circled 2 and 4.

If you circled other combinations, you don't have a clear detail-focus/big picture pattern.

High-Structure/Low Structure Learning

You're a High-Structure learner if you circled 1 and 3.

You're a Low-Structure learner if you circled 2 and 4.

If you circled other combinations, you don't have a clear high-/low-structure pattern.

When Do You Learn Best?

To answer this question, you'll have to take data on when and under what conditions you perform different kinds of learning tasks best. (See "When Do You Learn Best," page 39.)

Empower Yourself

Don't Let Labels Limit You

We are all unique, with different strengths and preferences stemming from both experience and innate tendencies. Although differences of talent and preference exist, it's important to remember that we are more similar than we are different—and that we're already performing much more complex tasks in everyday life than will be required in the formal settings of school and the workplace: Researchers in artificial intelligence found that daily living tasks are often much more complex than academic tasks. They've taught computers to perform formal academic tasks. But the daily living tasks we take for granted are much too hard for computers.

What does this mean? It means: *Don't let the label of a particular learning style or learning disability limit you.* For example, if you've been told that you're an auditory learner, don't let that stop you from taking notes. (If you rely on your auditory strength alone, you won't have a record of what was said; and your visual learning skills, which need to be stronger, will get weaker.)

Think of this analogy: Most cars can travel at 160 mph, when the speed limit is 70. They have more capacity than they need. In a similar way, human beings use only a fraction of their intellectual capabilities in formal settings.

Anybody who functions normally in daily life performs much more complex activities than academic work requires. If you can handle the complexity of everyday life, there is no reason you should fail in the simpler, more structured environment of formal learning in college.

So if you have an unusual learning style or a skill deficit, take heart. You're only using a small part of your natural thinking skills. We can help you bridge the gap. Success is only a strategy away.

In Your Words:

Don't Let Labels Limit You

In what ways do you feel you are now limited by your unusual learning style or learning disability?

Look back at this statement at the end of the semester. See what changes you were able to make by using LTL.

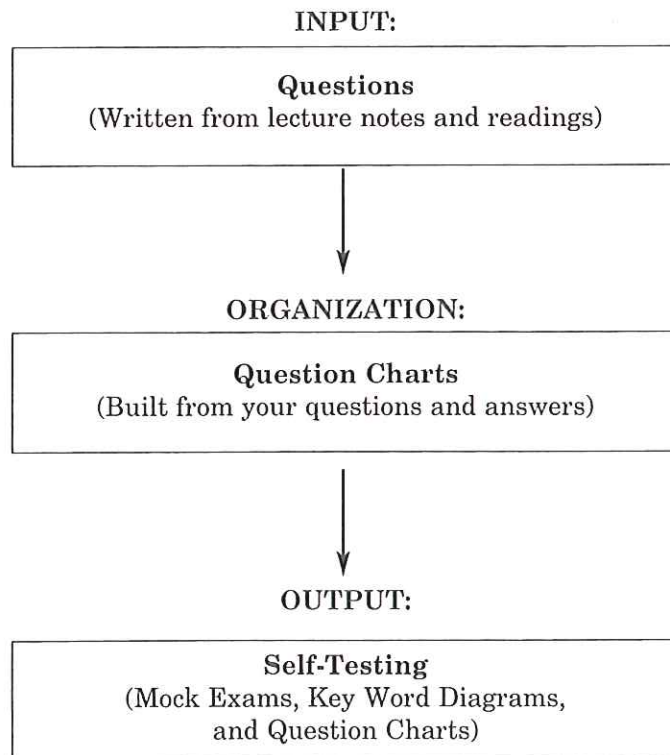
THE STRUCTURE OF LEARNING

All learning—in and out of school—has three stages: Input, where information is gathered; Organization, where new information is given structure, and the learner sees its relationship to past knowledge; and Output, where the learner comes up with a product or a process.

In school, note-taking and reading fall into the Input Stage; in the Organization Stage students fit new information into a pattern of previously known information; taking exams and writing papers are in the Output Stage. The key LTL skills fit into this structure of learning in the following way:

1. **Input.** Writing questions (from lecture notes and books).
2. **Organization.** Arranging what you've learned into Question Charts and breaking up your homework assignments into a series of smaller tasks.
3. **Output.** Testing yourself, using questions you've written and information you've organized; writing to answer questions, or constructing Question Charts, Key Word Diagrams, and Mock Exams.

The following diagram shows how the major LTL skills are related:



BOTH SIDES OF YOUR BRAIN

GAMES

1. Taking a Mental Picture

In this game, you'll practice taking a mental picture. Here are the steps:

1. Look closely at something.
2. Close your eyes.
3. Try to recall what you saw. "See" what you saw in your mind's eye.
4. Repeat this process 3 times.



You can try this individually, practicing when you're on a bus or waiting in line at the Post Office. Or you can try this activity as a game in class.

If you're playing this game in class, you will need:

- ◆ 2 teams of students;
- ◆ 2 sets of "busy" pictures—pictures that have a lot going on in them;
- ◆ a stop watch with a hand that counts seconds; and
- ◆ 2 chalkboards or 2 flip charts.

In each round, one member of each team gets 5 seconds to view the picture; closed eyes; 3 seconds; closed eyes; 2 seconds; closed eyes.

Each team member then tells his/her team as many details as possible—as well as the "big picture" story of the picture (i.e., it's a 4th of July celebration). A designated team member writes whatever is recalled on the chalkboard or flip chart. Each detail counts 1 point; the "big picture" description counts 5 points.

The team whose members get the most points wins the game.

2. Picturing Ideas

Each team is given a set of 3" x 5" cards. Each card contains a brief written policy listed in your college's student handbook or catalogue. The set of cards for Team A is identical to the set given to Team B.

1. Form 2 teams.
2. A member of each team gets the Card #1 of the team's set of cards.
3. The student with the card looks at it, then draws a simple picture of it—like the simple picture "describing" *radiation* on page 33. (One or two key words can be added to your picture if needed.) The student with the card does *not* show the written card to anyone else on the team.
4. Team members gather around the "artist." The object of the game is for team member(s) to call out the meaning of the term. Whichever team first calls out the correct meaning of the picture wins the round.
5. Another member of each team gets Card #2, and becomes the designated "artist" for that round.
6. Play 5–6 rounds of the game.