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## The Importance of Skillful Thinking

*As the soil, however rich it may be, cannot be productive without cultivation, so the mind without culture can never produce good fruit.*

—Seneca (3 B.C.E.–65 C.E.)

**W**E ALL THINK. In the course of our lives we engage in thinking in a variety of ways. Sometimes we engage in routine thinking—almost automatic, seemingly mindless thinking that carries us through the mundane tasks of everyday living and working. At other times we engage in rather impulsive thinking—almost reactive, knee-jerk thinking that on occasion may lead us to jump to unwarranted conclusions. Then there’s intuitive thinking, when thoughts or solutions seem to just suddenly and effortlessly pop into our heads. There’s even sloppy thinking, when—perhaps because of haste, inattentiveness, or ignorance of how to do what we’re trying to do—we skip important mental moves, such as failing to check the accuracy of someone’s claim before acting on it. Finally, there’s skillful thinking. A great many of us don’t do much skillful thinking. But we could—and should.

### What is Skillful Thinking?

*Skillful thinking* is the proficient and strategic application of appropriate thinking skills and productive habits of mind, as needed, to develop thoughtful products, such as decisions, arguments, and other analytical, creative, or critical products. Individuals who are skillful thinkers can and do employ such thinking skills and habits of mind on their own initiative, and they monitor their use as needed.

Skillful thinking can help us to achieve the highest standards in our quest for knowing and understanding the world around us and for acting wisely based on this knowledge and understanding. Skillful thinking has three components:

1. *Thinking skills.* Using specific and appropriate mental procedures for the kind of thinking engaged in by the thinker.
2. *Habits of mind.* Driving the use of these procedures in ways that manifest broad and productive task-related mental behaviors.

3. *Metacognition*. Doing both of these based on the thinker's own assessment of what is called for by the thinking task and guided by the thinker's plan as to how to accomplish the task.

This book is not a book *just* about skillful thinking, however. It is primarily about how we can make use of effective educational practices to *infuse instruction in skillful thinking into standard content instruction* at any educational level and in any subject area to also achieve dramatic improvement in students' content learning, in their thinking, in their writing, in their motivation to learn, in their test performance, and in their self-image. These practices derive primarily from those involved in *direct instruction*. The result, we venture to say, is education as it should be—what we all strive to achieve as dedicated educators.

A real episode of skillful thinking involves the planned, proficient, purposeful application of appropriate thinking procedures in engaging in a thinking task, not skipping any key operations, supporting it with appropriate mental attitudes, and drawing on relevant knowledge. In skillful thinkers this process is habitual and automatic. Skillful thinkers think about how they are going to do the thinking they want to do before engaging in it as well as while doing it. They use a variety of thinking operations, often in combination, and in the context of various abiding mental attitudes, to accomplish their thinking goals. They stick to their thinking, troubleshooting and adjusting their approaches, until they are satisfied with the results.

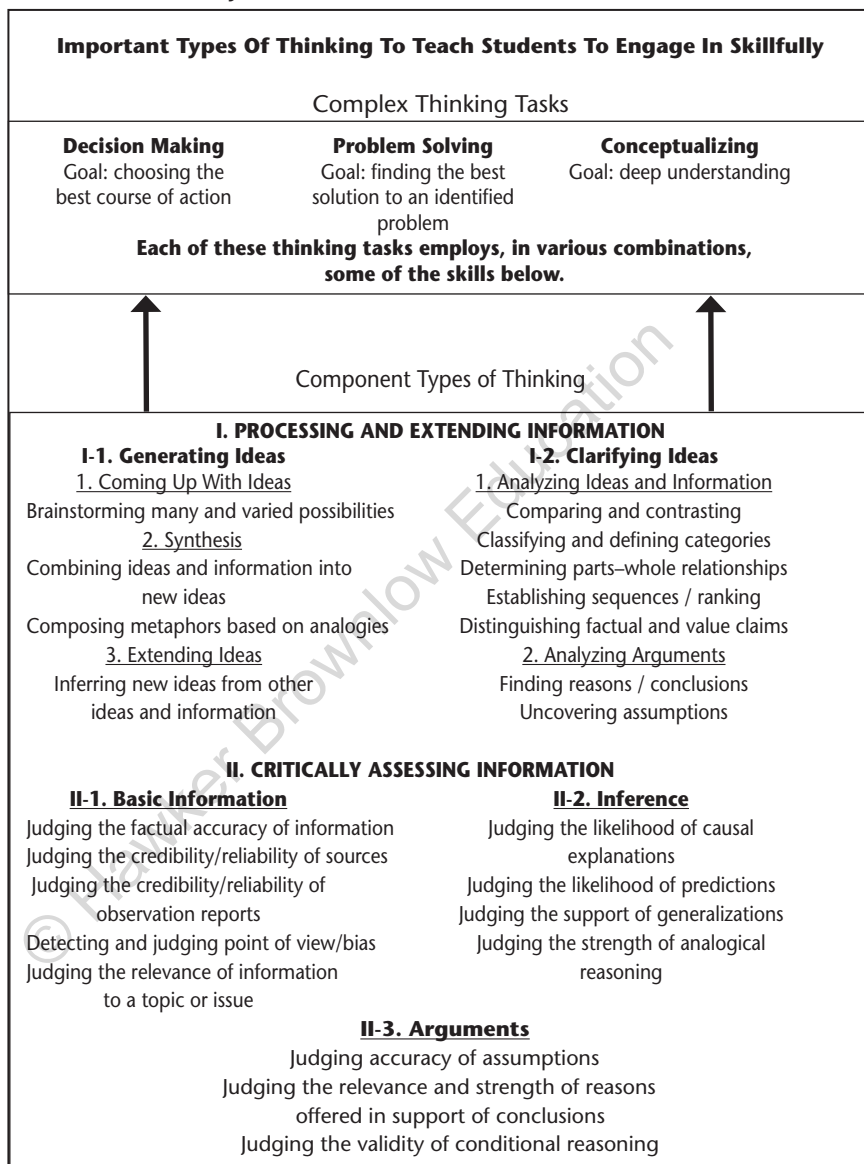
For example, suppose I need to buy a new automobile. I might say the following to myself:

I want to be careful here. I have made mistakes in the past mainly because I have been hasty and overlooked important things. This time I want to make sure I think this through as carefully as I can. So I will make a list of the important factors I need to take into account in considering a new car, make sure I look at as many possibilities as I think might serve my needs, and then gather information about them to see how close they come to meeting my criteria. Perhaps I can even get some firsthand information about the cars I am considering myself by test-driving them. Maybe I should keep a notebook and organize it by categories, based on the criteria I come up with, so I can record some of this information. And I certainly want to make sure that the information I get from others is coming from credible and reliable sources.

Then, when I think more about it, I might say this to myself:

You know, I think I also should get the thoughts of my family. I am not the only one who will be using the car. Maybe they have some

Figure 1-5. Important Types of Thinking to Teach Students to Engage in Skillfully



- What is included on this list—whether it designates a complex type of thinking like decision making or a more circumscribed type of thinking like predicting—does not carry with it an indication of what we need to teach students for them to learn to employ these skillfully. The skillful practice of each type of thinking consists of procedures by which it is operationalized and by the use

## CHAPTER 2


# Teaching Skillful Thinking: A Demonstration Lesson

*It is not enough to have a good mind. The main thing is to use it well.*  
—René Descartes

THE STUDENTS IN Alice Fischer’s eighth-grade classroom are involved in a science activity. They are explaining how a bird of prey is able to get enough food to survive. They are to write a description of what happens from the time this bird, the American kestrel, sights its prey to the time it eats its prey. These students have been working from the passage shown in Figure 2-1, a composite the teacher has put together based on information in various books on birds of America, and from their prior understanding of the way that certain abilities (e.g., sight) of living organisms work.

The students in this class have been asked to write as if they have been hired by the publisher of a bird book to write one more paragraph describing the dynamics of this bird in action. The teacher is stressing this essential question: How does the operation of key parts of this bird contribute to its success as a hunter and hence to its survival as an organism and a species? Figure 2-2 shows one of the pieces of student writing.

**Figure 2-1. Teacher’s Composite About the American Kestrel**

<b>The American Kestrel</b>	
<p><i>American Kestrel.</i> The American kestrel is one of the most common birds of prey in both North and South America. Its population has flourished. It is characterized by long, narrow, gray markings. It is known for its habit of hovering in one place while hunting its prey, generally consisting of snakes, lizards, large insects, and small rodents. This evolved hunting skill involves the ability to detect any small movement on the ground, the ability to hover while scanning the ground for prey, and the speed and strength to plunge onto the prey from heights of 50 feet or more. All these skills depend on the kestrel’s good sense of depth perception.</p>	

### **Skillful Thinking in the Classroom: Infusing Skillful Parts–Whole Analysis Into Content Instruction**

There are a number of key ingredients in the lesson we are about to examine. The teacher will do the following:

- Introduce students to the content material in the lesson
- Introduce students to the thinking skill and mental habits that the lesson will focus on and explicitly describe what makes the practice of these skillful
- Prompt the students to actively use this thinking skill and display these mental habits to think about the content in depth
- Engage the students in monitoring and evaluating their own thinking

Let's see how these actions play themselves out in Ms. Fischer's lesson on the kestrel.

Ms. Fischer starts her 50-minute class by announcing that the students are going to explore some of the basic concepts in the chapter they were assigned to read in their science textbook, "Predator–Prey Relationships as a Primary Mechanism for the Survival of Species." These concepts include food chains, as well as the ways that certain creatures are adapted to hunt for food. She asks her students to pair up and spend a minute explaining to each other what the chapter is about. When they have talked to each other awhile, she adds the following:

In order to help you think carefully about this idea, we will also be working on a type of thinking in class, the thinking involved in how to analyze whole objects into their parts. We will be learning how to do this kind of thinking in a more careful and skillful way than we do now.

As she says this she writes "Parts–Whole Analysis" on the board and underlines it for emphasis. "Expert use of this kind of thinking is very important whenever you try to understand how something works and what it does," she says. Then she relates this to what they are learning in science:

As we improve our ability to do parts–whole thinking we will use that kind of thinking to analyze how a specific predator works—a predator we are about to study called the American kestrel, a kind of hawk. Our goal is to find out whether there is anything special about its parts that make this bird an excellent hunter, and if so what.

Ms. Fischer reminds them that they will be developing a thinking strategy map for skillful parts–whole thinking and then using a special

**Table 4-1. Questions That Prompt Climbing the Ladder of Metacognition Before, During, and After Thinking**

<b>Rung</b>	<b>Metacognitive Level</b>	<b>Teacher Poses Such Questions as...</b>
4th	PLANNING ahead for future thinking	How might you do this thinking next time? As you anticipate similar problems in the future, what insights might you carry forth about how to think them through? When else in this course, school, life, or work might this strategy prove useful? Why is it important for you to...?
3rd	EVALUATING the effectiveness of the strategy—before, during, and after	How well did your strategy work for you? How do you know your strategy is working? What corrections or alterations in your strategy are you making as you...? What will you pay attention to while you are solving this problem to let you know your strategy is working? What alternative strategies might you employ if you find that your strategy is not working? Why do you think this is the best strategy? What has worked for you in the past? What makes you think that this strategy will work in this situation? By what criteria will you judge that this is the best way to approach this problem?
2nd	DESCRIBING the strategy you use in the thinking	<i>Before:</i> What approaches will you employ...? As you approach this problem, how will you try to solve it? <i>During:</i> As you consider the steps in the skillful problem-solving process, where are you...? What patterns are you noticing in your approach to solving this problem? What questions are you asking yourself? <i>After:</i> As you reflect on your problem-solving strategy, what did it involve? What led you to this decision? What questions were you asking yourself?
1st	Being AWARE of the kind of thinking you have done	Name the kind of thinking you are or will be doing. What type of thinking was going on in your head when...? While you were thinking about____, what thinking processes were you using?