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Why Don't Students Like School?

Question: Most of the teachers I know entered the profession because they loved school as children. They want to help their students feel the same excitement and passion for learning that they felt. They are understandably dejected when they find that some of their pupils don't like school much, and that they, the teachers, have great difficulty inspiring them. Why is it difficult to make school enjoyable for students?

Answer: Contrary to popular belief, the brain is not designed for thinking. It's designed to save you from having to think, because the brain is actually not very good at thinking. Thinking is slow and unreliable. Nevertheless, people enjoy mental work if it is successful. People like to solve problems, but not to work on unsolvable problems. If schoolwork is always just a bit too difficult for a student, it should be no surprise that she doesn't like school much. The cognitive principle that guides this chapter is:

> People are naturally curious, but we are not naturally good thinkers; unless the cognitive conditions are right, we will avoid thinking.

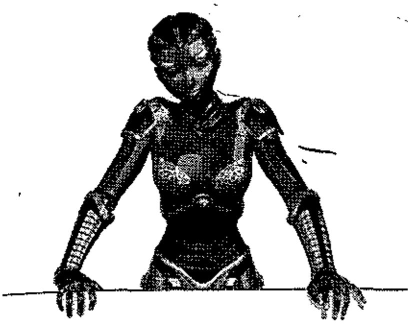
The implication of this principle is that teachers should reconsider how they encourage their students to think, in order to maximize the likelihood that students will get the pleasurable rush that comes from successful thought.

The Mind Is Not Designed for Thinking

What is the essence of being human? What sets us apart from other species? Many people would answer that it is our ability to reason—birds fly, fish swim, and humans think. (By *thinking* I mean solving problems, reasoning, reading something complex, or doing any mental work that requires some effort.) Shakespeare extolled our cognitive ability in *Hamlet*: "What a piece of work is man! How noble in reason!" Some three hundred years later, however, Henry Ford more cynically observed, "Thinking is the hardest work there is, which is the probable reason why so few people engage in it."* They both had a point. Humans are good at certain types of reasoning, particularly in comparison to other animals, but we exercise those abilities infrequently. A cognitive scientist would add another observation: Humans don't think very often because our brains are designed not for thought but for the avoidance of thought. Thinking is not only effortful, as Ford noted, it's also slow and unreliable.

Your brain serves many purposes, and thinking is not the one it serves best. Your brain also supports the ability to see and to move, for example, and these functions operate much more efficiently and reliably than your ability to think. It's no accident that most of your brain's real estate is devoted to these activities. The extra brain power is needed because seeing is actually more difficult than playing chess or solving calculus problems.

You can appreciate the power of your visual system by comparing human abilities to those of computers. When it comes to math, science, and other traditional "thinking" tasks, machines beat people, no contest. Five dollars will get you a calculator that can perform simple calculations faster and more accurately than any human can. With fifty dollars you can buy chess software that can defeat more than 99 percent of the world's population. But the most powerful computer on the planet can't drive a truck. That's because computers can't see, especially not in complex, ever-changing environments like the one you face every time you drive. Robots are similarly limited in how they move. Humans are excellent at configuring our bodies as needed for tasks, even if the configuration is unusual, such as when you twist your torso and contort your arm in an effort to dust behind books on a shelf. Robots are not very good



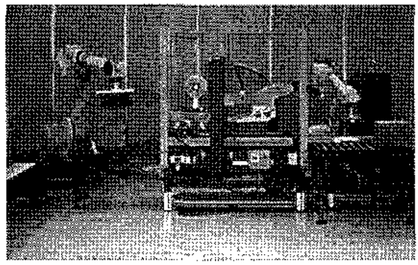


FIGURE 1: Hollywood robots (left), like humans, can move in complex environments, but that's true only in the movies. Most real-life robots (right) move in predictable environments. Our ability to see and move is a remarkable cognitive feat.

at figuring out novel ways to move, so they are useful mostly for repetitive work such as spray painting automotive parts, for which the required movements are always the same. Tasks that you take for granted—for example, walking on a rocky shore where the footing is uncertain—are much more difficult than playing top-level chess. No computer can do it (Figure 1).

Compared to your ability to see and move, thinking is slow, effortful, and uncertain. To get a feel for why I say this, try solving this problem:

> In an empty room are a candle, some matches, and a box of tacks. The goal is to have the lit candle about five feet off the ground. You've tried melting some of the wax on the bottom of the candle and sticking it to the wall, but that wasn't effective. How can you get the lit candle five feet off the ground without having to hold it there?[1]

Twenty minutes is the usual maximum time allowed, and few people are able to solve it by then, although once you hear the answer you will realize it's not especially tricky. You dump the tacks out of the box, tack the box to the wall, and use it as a platform for the candle.

This problem illustrates three properties of thinking. First, thinking is *slow.* Your visual system instantly takes in a complex scene. When you enter a friend's backyard you don't think to yourself, "Hmmm, there's some green stuff. Probably grass, but it could be some other ground cover—and what's that rough brown object sticking up there? A fence, perhaps?" You take in the whole scene—lawn, fence, flowerbeds, gazebo—at a glance. Your thinking system does not instantly calculate the answer to a problem the way your visual system immediately takes in a visual scene. Second, thinking is *effortful;* you don't have to try to see, but thinking takes concentration. You can perform other tasks while you are seeing, but you can't think about something else while you are working on a problem. Finally, thinking is *uncertain.* Your visual system seldom makes mistakes, and when it does you usually think you see something similar to what is actually out there—you're close, if not exactly right. Your thinking system might not even get you close; your solution to a problem may be far from correct. In fact, your thinking system may not produce an answer at all, which is what happens to most people when they try to solve the candle problem.

If we're all so bad at thinking, how does anyone get through the day? How do we find our way to work or spot a bargain at the grocery store? How does a teacher make the hundreds of decisions necessary to get through her day? The answer is that when we can get away with it, we don't think. Instead we rely on memory. Most of the problems we face are ones we've solved before, so we just do what we've done in the past. For example, suppose that next week a friend gives you the candle problem. You immediately say, "Oh, right. I've heard this one. You tack the box to the wall." Just as your visual system takes in a scene and, without any effort on your part, tells you what is in the environment, so too your memory system immediately and effortlessly recognizes that you've heard the problem before and provides the answer. You may think you have a terrible memory, and it's true that your memory system is not as reliable as your visual or movement system—sometimes you forget, sometimes you *think* you remember when you don't—but your memory system is much more reliable than your thinking system, and it provides answers quickly and with little effort.

We normally think of memory as storing personal events (memories of my wedding) and facts (George Washington was the first president of the United States). Our memory also stores strategies to guide what we should do: where to turn when driving home, how to handle a minor dispute when monitoring recess, what to do when a pot on the stove starts to boil over (Figure 2). For the vast majority of decisions we make, we don't stop to consider what we might do, reason about it, anticipate possible consequences, and so on. For example, when I decide to make spaghetti for dinner, I don't pore over my cookbooks, weighing each recipe for taste, nutritional value, ease of preparation, cost of ingredients, visual appeal, and so on—I just make spaghetti sauce the way I usually do. As two psychologists put it, "Most of the time what we do is what we do most of the time."[2] When you feel as though you are "on autopilot," even if you're doing something rather complex, such as driving home from school, it's because you are using memory to guide your behavior. Using memory doesn't require much of your attention, so you are free to daydream, even as you're stopping at red lights, passing cars, watching for pedestrians, and so on.

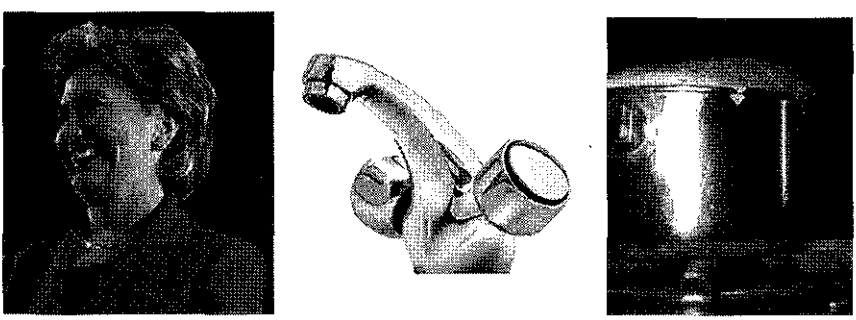


FIGURE 2: Your memory system operates so quickly and effortlessly that you seldom notice it working. For example, your memory has stored away information about what things look like (Hillary Clinton's face) and how to manipulate objects (turn the left faucet for hot water, the right for cold), and strategies for dealing with problems you've encountered before (such as a pot boiling over).

FIGURE 3: "Thinking outside the box" for a mundane task like selecting bread at the supermarket would probably not be worth the mental effort.

Of course you *could* make each decision with care and thought. When someone encourages you to "think outside the box" that's usually what he means—don't go on autopilot, don't do what you (or others) have always done. Consider what life would be like if you *always* strove to think outside the box. Suppose you approached every task afresh and tried to see all of its possibilities, even daily tasks like chopping an onion, entering your office building, or buying a soft drink at lunch. The novelty might be fun for a while, but life would soon be exhausting (Figure 3).

You may have experienced something similar when traveling, especially if you've traveled where you don't speak the local language. Everything is unfamiliar and even trivial actions demand lots of thought. For example, buying a soda from a vendor requires figuring out the flavors from the exotic packaging, trying to communicate with the vendor, working through which coin or bill to use, and so on. That's one reason that traveling is so tiring: all of the trivial actions that at home could be made on autopilot require your full attention.

So far I've described two ways in which your brain is set up to save you from having to think. First, some of the most important functions (for example, vision and movement) don't require thought: you don't have to reason about what you see; you just immediately know what's out in the world. Second, you are biased to use memory to guide your actions rather than to think. But your brain doesn't leave it there; it is capable of changing in order to save you from having to think. If you repeat the same thought-demanding task again and again, it will eventually become automatic; your brain will change so that you can complete the task without thinking about it. I discuss this process in more detail in Chapter Five, but a familiar example here will illustrate what I mean. You can probably recall that learning to drive a car was mentally very demanding. I remember focusing on how hard to depress the accelerator, when and how to apply the brake as I approached a red light, how far to turn the steering wheel to execute a turn, when to check my mirrors, and so forth. I didn't even listen to the radio while I drove, for fear of being distracted. With practice, however, the process of driving became automatic, and now I don't need to think about those small-scale bits of driving any more than I need to think about how to walk. I can drive while simultaneously chatting with friends, gesturing with one hand, and eating French fries—an impressive cognitive feat, if not very attractive to watch. Thus a task that initially takes a great deal of thought becomes, with practice, a task that requires little or no thought.

The implications for education sound rather grim. If people are bad at thinking and try to avoid it, what does that say about students' attitudes toward school? Fortunately, the story doesn't end with people stubbornly refusing to think. Despite the fact that we're not that good at it, we actually *like* to think. We are naturally curious, and we look for opportunities to engage in certain types of thought. But because thinking is so hard, the conditions have to be right for this curiosity to thrive, or we quit thinking rather readily. The next section explains when we like to think and when we don't.

People Are Naturally Curious, but Curiosity Is Fragile

Even though the brain is not set up for very efficient thinking, people actually enjoy mental activity, at least in some circumstances. We have hobbies like solving crossword puzzles or scrutinizing maps. We watch information-packed documentaries. We pursue careers—such as teaching—that offer greater mental challenge than competing careers, even if the pay is lower. Not only are we willing to think, we intentionally seek out situations that demand thought.

Solving problems brings pleasure. When I say "problem solving" in this book, I mean any cognitive work that succeeds; it might be understanding a difficult passage of prose, planning a garden, or sizing up an investment opportunity. There is a sense of satisfaction, of fulfillment, in successful thinking. In the last ten years neuroscientists have discovered that there is overlap between the brain areas and chemicals that are important in learning and those that are important in the brain's natural reward system. Many neuroscientists suspect that the two systems are related. Rats in a maze learn better when rewarded with cheese. When you solve a problem, your brain may reward itself with a small dose of dopamine, a naturally occurring chemical that is important to the brain's pleasure system. Neuroscientists know that dopamine is important in both systems—learning and pleasure—but haven't yet worked out the explicit tie between them. Even though the neurochemistry is not completely understood, it seems undeniable that people take pleasure in solving problems.

It's notable too that the pleasure is in the *solving* of the problem. Working on a problem with no sense that you're making progress is not pleasurable. In fact, it's frustrating. Then too, there's not great pleasure in simply knowing the answer. I told you the solution to the candle problem; did you get any fun out of it? Think how much more fun it would have been if you had solved it yourself—in fact, the problem would have seemed more clever, just as a joke that you get is funnier than a joke that has to be explained. Even if someone doesn't tell you the answer to a problem, once you've had too many hints you lose the sense that *you've* solved the problem, and getting the answer doesn't bring the same mental snap of satisfaction.

Mental work appeals to us because it offers the opportunity for that pleasant feeling when it succeeds. But not all types of thinking are equally attractive. People choose to work crossword puzzles but not algebra problems. A biography of Bono is more likely to sell well than a biography of Keats. What characterizes the mental activity that people enjoy (Figure 4)?

The answer that most people would give may seem obvious: "I think crossword puzzles are fun and Bono is cool, but math is boring and so is Keats." In other words, it's the content that matters. We're curious about some stuff but not about other stuff. Certainly that's the way people describe our own interests—"I'm a stamp collector" or "I'm into medieval symphonic music." But I don't think content drives interest. We've all attended a lecture or watched

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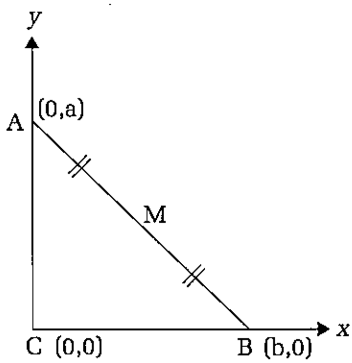
Fill the 9 × 9 grid so each column, row, and each 3 × 3 box contains the digits 1–9.



Prove that the midpoint of the hypotenuse of a right triangle is equidistant from the vertices of the triangle.

FIGURE 4: Why are many people fascinated by problems like the one shown on the left, but very few people willingly work on problems like the one on the right?

a TV show (perhaps against our will) about a subject we thought we weren't interested in, only to find ourselves fascinated; and it's easy to get bored even when you usually like the topic. I'll never forget my eagerness for the day my middle school teacher was to talk about sex. As a teenage boy in a staid 1970s suburban culture, I fizzed with anticipation of any talk about sex, anytime, anywhere. But when the big day came, my friends and I were absolutely disabled with boredom. It's not that the teacher talked about flowers and pollination—he really did talk about human sexuality—but somehow it was still dull. I actually wish I could remember how he did it; boring a bunch of hormonal teenagers with a sex talk is quite a feat.

I once made this point to a group of teachers when talking about motivation and cognition. About five minutes into the talk I presented a slide depicting the model of motivation shown in Figure 5. I didn't prepare the audience for the slide in any way; I just put it up and started describing it. After about fifteen seconds I stopped and said to the audience, "Anyone who is still listening to me, please raise your hand." One person did. The other fifty-nine were also attending voluntarily; it was a topic in which they were presumably interested, and the talk had only just started—but in fifteen seconds their minds were somewhere else. The content of a problem—whether it's about sex or human motivation—may be sufficient to prompt your interest, but it won't maintain it.

So, if content is not enough to keep your attention, when does curiosity have staying power? The answer may lie in the difficulty of the problem. If we get a little burst of pleasure from solving a problem, then there's no point in working on a problem that is too easy—there'll be no pleasure when it's solved because it didn't feel like much of a problem in the first place. Then too, when you size up a problem as very difficult, you are judging that you're unlikely to solve it, and are therefore unlikely to get the satisfaction that comes with the solution. A crossword puzzle that is too easy is just mindless work: you fill in the squares, scarcely thinking about it, and there's no gratification, even though you're getting all the answers. But you're unlikely to work long at a crossword puzzle that's too difficult. You know you'll solve very little of it, so it will just be frustrating. The slide in Figure 5 is too detailed to be absorbed with minimal introduction; my audience quickly

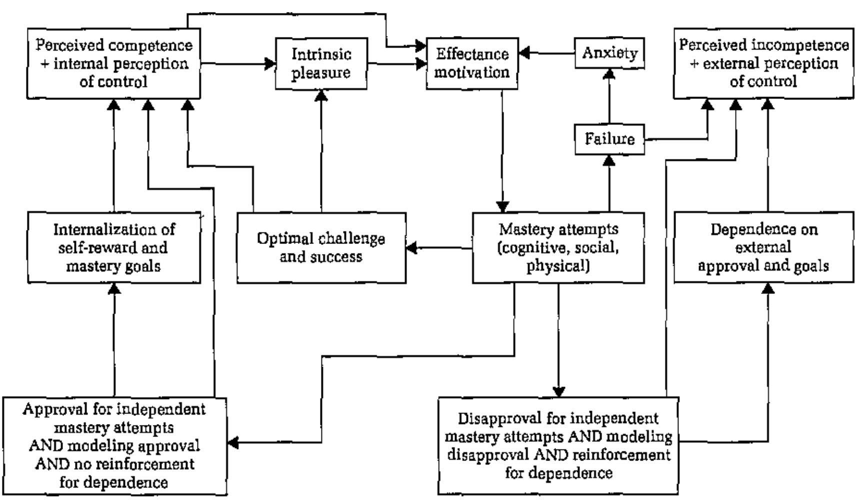


FIGURE 5: A difficult-to-understand figure that will bore most people unless it is adequately introduced.

concluded that it was overwhelming and mentally checked out of my talk.

To summarize, I've said that thinking is slow, effortful, and uncertain. Nevertheless, people like to think—or more properly, we like to think if we judge that the mental work will pay off with the pleasurable feeling we get when we solve a problem. So there is no inconsistency in claiming that people avoid thought and in claiming that people are naturally curious—curiosity prompts people to explore new ideas and problems, but when we do, we quickly evaluate how much mental work it will take to solve the problem. If it's too much or too little, we stop working on the problem if we can.

This analysis of the sorts of mental work that people seek out or avoid also provides one answer to why more students don't like school. Working on problems that are of the right level of difficulty is rewarding, but working on problems that are too easy or too difficult is unpleasant. Students can't opt out of these problems the way adults often can. If the student routinely gets work that is a bit too difficult, it's little wonder that he doesn't care much for school. I wouldn't want to work on the Sunday *New York Times* crossword puzzle for several hours each day.

So what's the solution? Give the student easier work? You could, but of course you'd have to be careful not to make it so easy that the student would be bored. And anyway, wouldn't it be better to boost the student's ability a little bit? Instead of making the work easier, is it possible to make thinking easier?

How Thinking Works

Understanding a bit about how thinking happens will help you understand what makes thinking hard. That will in turn help you understand how to make thinking easier for your students, and therefore help them enjoy school more.

Let's begin with a very simple model of the mind. On the left of Figure 6 is the environment, full of things to see and hear, problems to be solved, and so on. On the right is one component of your

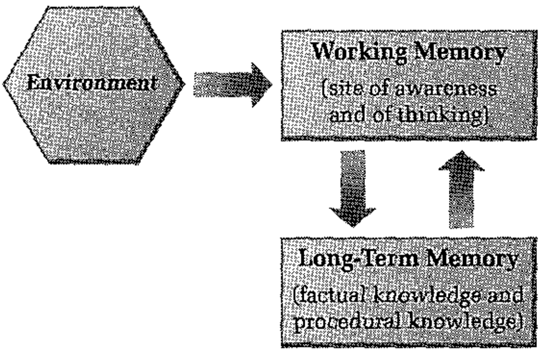


FIGURE 6: Just about the simplest model of the mind possible.

mind that scientists call *working memory.* For the moment, consider it to be synonymous with consciousness; it holds the stuff you're thinking about. The arrow from the environment to working memory shows that working memory is the part of your mind where you are aware of what is around you: the sight of a shaft of light falling onto a dusty table, the sound of a dog barking in the distance, and so forth. Of course you can also be aware of things that are not currently in the environment; for example, you can recall the sound of your mother's voice, even if she's not in the room (or indeed no longer living). *Long-term memory* is the vast storehouse in which you maintain your factual knowledge of the world: that ladybugs have spots, that your favorite flavor of ice cream is chocolate, that your three-year-old surprised you yesterday by mentioning kumquats, and so on. Factual knowledge can be abstract; for example, it would include the idea that triangles are closed figures with three sides, and your knowledge of what a dog generally looks like. All of the information in long-term memory resides outside of awareness. It lies quietly until it is needed, and then enters working memory and so becomes conscious. For example, if I asked you, "What color is a polar bear?" you would say "white" almost immediately. That information was in long-term memory thirty second ago, but you weren't aware of it until I posed the question that made it relevant to ongoing thought, whereupon it entered working memory.

Thinking occurs when you combine information (from the environment and long-term memory) in new ways. That combining happens in working memory. To get a feel for this process, read the problem depicted in Figure 7 and try to solve it. (The point is not so much to solve it as to experience what is meant by thinking and working memory).

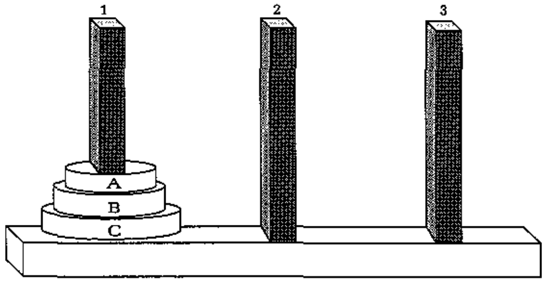


FIGURE 7: The figure depicts a playing board with three pegs. There are three rings of decreasing size on the leftmost peg. The goal is to move all three rings from the leftmost peg to the rightmost peg. There are just two rules about how you can move rings: you can move only one ring at a time, and you can't place a larger ring on top of a smaller ring.

With some diligence you might be able to solve this problem,† but the real point is to feel what it's like to have working memory absorbed by the problem. You begin by taking information from the environment—the rules and the configuration of the game board—and then imagine moving the discs to try to reach the goal. Within working memory you must maintain your current state in the puzzle—where the discs are—and imagine and evaluate potential moves. At the same time you have to remember the rules regarding which moves are legal, as shown in Figure 8.

The description of thinking makes it clear that knowing *how* to combine and rearrange ideas in working memory is essential to successful thinking. For example, in the discs and pegs problem, how do you know where to move the discs? If you hadn't seen the problem before, you probably felt like you were pretty much guessing. You didn't have any information in long-term memory to guide you as depicted in Figure 8. But if you have had exprence with this particular type of problem, then you likely have information in long-term memory about how to solve it, even if the information is not

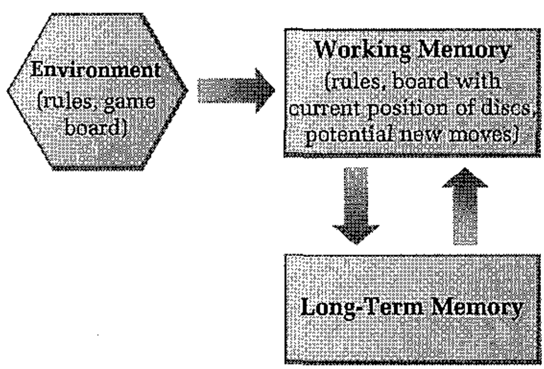


FIGURE 8: A depiction of your mind when you're working on the puzzle shown in Figure 7.

foolproof. For example, try to work this math problem in your head:

$$18 \times 7$$

You know just what to do for this problem. I'm confident that the sequence of your mental processes was something close to this:

1. Multiply 8 and 7.
2. Retrieve the fact that $8 \times 7 = 56$ from long-term memory.
3. Remember that the 6 is part of the solution, then carry the 5.
4. Multiply 7 and 1.
5. Retrieve the fact that $7 \times 1 = 7$ from long-term memory.
6. Add the carried 5 to the 7.
7. Retrieve the fact that $5 + 7 = 12$ from long-term memory.
8. Put the 12 down, append the 6.
9. The answer is 126.

Your long-term memory contains not only factual information, such as the color of polar bears and the value of 8×7, but it also contains what we'll call *procedural knowledge*, which is your knowledge of the mental procedures necessary to execute tasks. If thinking is combining information in working memory, then procedural knowledge is a list of what to combine and when—it's like a recipe to accomplish a particular type of thought. You might have stored procedures for the steps needed to calculate the area of a triangle, or to duplicate a computer file using Windows, or to drive from your home to your office.

It's pretty obvious that having the appropriate procedure stored in long-term memory helps a great deal when we're thinking. That's why it was easy to solve the math problem and hard to solve the discs-and-pegs problem. But how about factual knowledge? Does that help you think as well? It does, in several different ways, which are discussed in Chapter Two. For now, note that solving the math problem required the retrieval of factual information, such as the fact that $8 \times 7 = 56$. I've said that thinking entails combining information in working memory. Often the information provided in the environment is not sufficient to solve a problem, and you need to supplement it with information from long-term memory.

There's a final necessity for thinking, which is best understood through an example. Have a look at this problem:

> In the inns of certain Himalayan villages is practiced a refined tea ceremony. The ceremony involves a host and exactly two guests, neither more nor less. When his guests have arrived and seated themselves at his table, the host performs three services for them. These services are listed in the order of the nobility the Himalayans attribute to them: stoking the fire, fanning the flames, and pouring the tea. During the ceremony, any of those present may ask another, "Honored Sir, may I perform this onerous task for you?" However, a person may request of another only the least noble of the tasks which the other is performing. Furthermore, if a person is performing any tasks, then he may not request a task that is nobler than the least noble task he is already performing. Custom requires that by the time the tea ceremony is over, all the tasks will have been transferred from the host to the most senior of the guests. How can this be accomplished?[3]

Your first thought upon reading this problem was likely "Huh?" You could probably tell that you'd have to read it several times just to understand it, let alone begin working on the solution. It seemed overwhelming because you did not have sufficient space in working memory to hold all of the aspects of the problem. Working memory has limited space, so thinking becomes increasingly difficult as working memory gets crowded.

The tea-ceremony problem is actually the same as the discs-and-pegs problem presented in Figure 7. The host and two guests are like the three pegs, and the tasks are the three discs to be moved among them, as shown in Figure 9. (The fact that very few people see this analogy

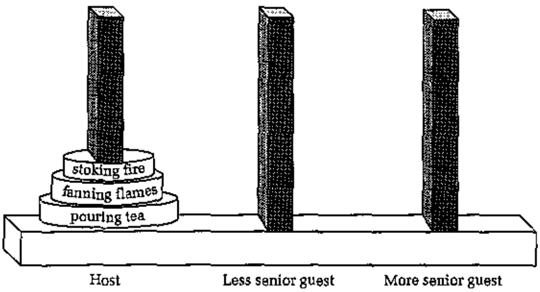


FIGURE 9: The tea-ceremony problem, depicted to show the analogy to the disc-and-pegs problem.

and its importance for education is taken up in Chapter Four.) This version of the problem seems much harder because some parts of the problem that are laid out in Figure 7 must be juggled in your head in this new version. For example, Figure 7 provides a picture of the pegs you can use to help maintain a mental image of the discs as you consider moves. The rules of the problem occupy so much space in working memory that it's difficult to contemplate moves that might lead to a solution.

In sum, successful thinking relies on four factors: information from the environment, facts in long-term memory, procedures in long-term memory, and the amount of space in working memory. If any one of these factors is inadequate, thinking will likely fail.

Let me summarize what I've said in this chapter. People's minds are not especially well-suited to thinking; thinking is slow, effortful, and uncertain. For this reason, deliberate thinking does not guide people's behavior in most situations. Rather, we rely on our memories, following courses of action that we have taken before. Nevertheless, we find *successful* thinking pleasurable. We like solving problems, understanding new ideas, and so forth. Thus, we will seek out opportunities to think, but we are selective in doing so; we choose problems that pose some challenge but that seem likely to be solvable, because these are the problems that lead to feelings of pleasure and satisfaction. For problems to be solved, the thinker needs adequate information from the environment, room in working memory, and the required facts and procedures in long-term memory.

Implications for the Classroom

Let's turn now to the question that opened this chapter: Why don't students like school, or perhaps more realistically, why don't more of them like it? Any teacher knows that there are lots of reasons that a student might or might not enjoy school. (My wife loved it, but primarily for social reasons.) From a cognitive perspective, an important factor is whether or not a student consistently experiences the pleasurable rush of solving a problem. What can teachers do to ensure that each student gets that pleasure?

Be Sure That There Are Problems to Be Solved

By *problem* I don't necessarily mean a question addressed to the class by the teacher, or a mathematical puzzle. I mean cognitive work that poses moderate challenge, including such activities as understanding a poem or thinking of novel uses for recyclable materials. This sort of cognitive work is of course the main stuff of teaching—we want our students to think. But without some attention, a lesson plan can become a long string of teacher explanations, with little opportunity for students to solve problems. So scan each lesson plan with an eye toward the cognitive work that students will be doing. How often does such work occur? Is it intermixed with cognitive breaks? When you have identified the challenges, consider whether they are open to negative outcomes such as students failing to understand what they are to do, or students being unlikely to solve the problem, or students simply trying to guess what you would like them to say or do.

Respect Students' Cognitive Limits

When trying to develop effective mental challenges for your students, bear in mind the cognitive limitations discussed in this chapter. For example, suppose you began a history lesson with a question: "You've all heard of the Boston Tea Party; why do you suppose the colonists dressed as Indians and dumped tea into the Boston harbor?" Do your students have the necessary background knowledge in memory to consider this question? What do they know about the relationship of the colonies and the British crown in 1773? Do they know about the social and economic significance of tea? Could they generate reasonable alternative courses of action? If they lack the appropriate background knowledge, the question you pose will quickly be judged as "boring." If students lack the background knowledge to engage with a problem, save it for another time when they have that knowledge.

Equally important is the limit on working memory. Remember that people can keep only so much information in mind at once, as you experienced when you read the tea-ceremony version of the discs-and-pegs problem. Overloads of working memory are caused by such things as multistep instructions, lists of unconnected facts, chains of logic more than two or three steps long, and the application of a just-learned concept to new material (unless the concept is quite simple). The solution to working memory overloads is straightforward: slow the pace, and use memory aids such as writing on the blackboard that save students from keeping too much information in working memory.

Clarifying the Problems to Be Solved

How can you make the problem interesting? A common strategy is to try to make the material "relevant" to students. This strategy sometimes works well, but it's hard to use for some material. Another difficulty is that a teacher's class may include two football fans, a doll collector, a NASCAR enthusiast, a horseback riding competitor—you get the idea. Mentioning a popular singer in the course of a history lesson may give the class a giggle, but it won't do much more than that. I have emphasized that our curiosity is provoked when we perceive a problem that we believe we can solve. What is the question that will engage students and make them want to know the answer?

One way to view schoolwork is as a series of *answers*. We want students to know Boyle's law, or three causes of the U.S. Civil War, or why Poe's raven kept saying, "Nevermore." Sometimes I think that we, as teachers, are so eager to get to the answers that we do not devote sufficient time to developing the question. But as the information in this chapter indicates, it's the question that piques people's interest. Being *told* an answer doesn't do anything for you. You may have noted that I could have organized this book around principles of cognitive psychology. Instead I organized it around questions that I thought teachers would find interesting.

When you plan a lesson, you start with the information you want students to know by its end. As a next step, consider what the key question for that lesson might be and how you can frame that question so it will have the right level of difficulty to engage your students and so you will respect your students' cognitive limitations.

Reconsider When to Puzzle Students

Teachers often seek to draw students into a lesson by presenting a problem that we believe will interest the students (for example, asking, "Why is there a law that you have to go to school?" could introduce the process by which laws are passed), or by conducting a demonstration or presenting a fact that we think students will find surprising. In either case, the goal is to puzzle students, to make them curious. This is a useful technique, but it's worth considering whether these strategies might be used not only at the beginning of a lesson but also *after* the basic concepts have been learned. For example, a classic science demonstration is to put a burning piece of paper in a milk bottle and then put a boiled egg over the bottle's opening. After the paper burns, the egg is sucked into the bottle. Students will no doubt be astonished, but if they don't know the principle behind it, the demonstration is like a magic trick—it's a momentary thrill, but their curiosity to understand may not be long-lasting. Another strategy would be to conduct the demonstration after students know that warm air expands and cooling air contracts, potentially forming a vacuum. Every fact or demonstration that would puzzle students before they have the right background knowledge has the potential to be an experience that will puzzle students *momentarily,* and then lead to the pleasure of problem solving. It is worth thinking about when to use a marvelous device like the egg-in-the-bottle trick.

Accept and Act on Variation in Student Preparation

As I describe in Chapter Eight, I don't accept that some students are "just not very bright" and ought to be tracked into less demanding classes. But it's naïve to pretend that all students come to your class equally prepared to excel; they have had different preparations, as well as different levels of support at home, and they will therefore differ in their abilities. If that's true, and if what I've said in this chapter is true, it is self-defeating to give all of your students the same work. The less capable students will find it too difficult and will struggle against their brain's bias to mentally walk away from schoolwork. To the extent that you can, it's smart, I think, to assign work to individuals or groups of students that is appropriate to their current level of competence. Naturally you will want to do this in a sensitive way, minimizing the extent to which some students will perceive themselves as behind others. But the fact is that they *are* behind the others, and giving them work that is beyond them is unlikely to help them catch up, and is likely to make them fall still further behind.

Change the Pace

We all inevitably lose the attention of our students, and as this chapter has described, it's likely to happen if they feel somewhat confused. They will mentally check out. The good news is that it's relatively easy to get them back. Change grabs attention, as you no doubt know. When there's a bang outside your classroom, every head turns to the windows. When you change topics, start a new activity, or in some other way show that you are shifting gears, virtually every student's attention will come back to you, and you will have a new chance to engage them. So plan shifts and monitor your class's attention to see whether you need to make them more often or less frequently.

Keep a Diary

The core idea presented in this chapter is that solving a problem gives people pleasure, but the problem must be easy enough to be solved yet difficult enough to take some mental effort. Finding this sweet spot of difficulty is not easy. Your experience in the classroom is your best guide—whatever works, do again; whatever doesn't, discard. But don't expect that you will really remember how well a lesson plan worked a year later. Whether a lesson goes brilliantly well or down in flames, it feels at the time that we'll never forget what happened; but the ravages of memory can surprise us, so write it down. Even if it's just a quick scratch on a sticky note, try to make a habit of recording your success in gauging the level of difficulty in the problems you pose for your students.

One of the factors that contributes to successful thought is the amount and quality of information in long-term memory. In Chapter Two I elaborate on the importance of background knowledge—on why it is so vital to effective thinking.

Notes

*A more eloquent version comes from eighteenth-century British painter Sir Joshua Reynolds: "There is no expedient to which a man will not resort to avoid the real labor of thinking."

†If you couldn't solve it, here's a solution. As you can see, the rings are marked A, B, and C, and the pegs are marked 1, 2, and 3. The solution is A3, B2, A2, C3, A1, B3, A3.

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9

What About My Mind?

Question: Most of this book has focused on the minds of students. What about the minds of teachers?

Answer: In Chapter One I outlined the cognitive requirements for students to think effectively: they need space in working memory, relevant background knowledge, and experience in the relevant mental procedures. Throughout the rest of the chapters I detailed principles of the mind that illustrate how those requirements might be met. Your mind is not different from those of your students. The cognitive principle that guides this chapter is:

> Teaching, like any complex cognitive skill, must be practiced to be improved.

I have discussed a lot of findings from cognitive science thus far. All of this discussion has focused on the minds of students. What about you? Isn't teaching a cognitive skill? So couldn't we apply these findings from cognitive science to *your* mind?

Teaching is indeed a cognitive skill, and everything I have said about students' minds applies to yours. Let's bring back the picture of the mind from Chapter One (see Figure 1) so I can briefly refresh your memory about the cognitive apparatus that must be in place for any type of effective thinking to occur, including effective teaching.

Thinking is the putting together of information in new ways—for example, comparing the structure of the solar system with the structure of an atom and recognizing that they have some similarities.

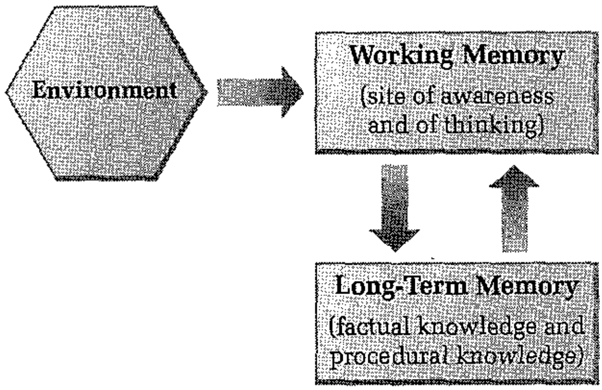


FIGURE 1: The return, and the swan song, of just about the simplest model of the mind possible.

This sort of manipulation of information happens in working memory, which is often called the staging ground of thought. The information manipulated in working memory might come from the environment (from things we see or hear, for example, such as a teacher describing the structure of an atom) or from long-term memory (from things we already know, for example, the structure of the solar system).

We use *procedures* to manipulate information (for example, a procedure that compares features of objects such as a solar system and an atom). Our long-term memory can store simple procedures as in "compare features of these two objects," as well as complex, multistage procedures to support tasks with lots of intermediate steps. For example, you might have stored the procedure to make pancakes or to change the oil in a car or to write a well-organized paragraph.

To think effectively, we need sufficient room in working memory, which has limited space. We also need the right factual and procedural knowledge in long-term memory. Let's think about how teaching fits into this framework.

Teaching as a Cognitive Skill

I have described to teachers how cognitive psychologists talk about working memory: they refer to it as a mental place where we juggle several things at once and where, if we try to juggle too many things, one or more things will be dropped. Teachers always respond in the same way: "Well of course! You've just described my work day." Formal experiments confirm this strong intuition; teaching is quite demanding of working memory.

It's just as evident that factual knowledge is important to teaching. In the last ten years or so, many observers have emphasized that teachers ought to have rich subject-matter knowledge, and there do seem to be some data that students of these teachers learn more, especially in middle and high school and especially in math. Somewhat less well known but just as important are other data showing that *pedagogical content knowledge* is also important. That is, for teachers, just knowing algebra really well isn't enough. You need to have knowledge particular to *teaching* algebra. Pedagogical content knowledge might include such things as knowledge of a typical student's conceptual understanding of slope, or the types of concepts that must be practiced and those that need not be. When you think about it, if pedagogical content knowledge were *not* important, then anyone who understood algebra could teach it well, and we know that's not true.

It's also pretty evident that a teacher makes extensive use of procedures stored in long-term memory. Some of these procedures handle mundane tasks, for example, the procedure for passing out papers or for leading students through the Pledge of Allegiance or for turn-taking during read-alouds. These stored procedures can also be much more complex, for example, a method for explaining what a limit of a function is or for handling a potentially dangerous student conflict in the cafeteria.

OK, so if teaching is a cognitive skill just like any other, how can you apply what I've discussed to your teaching? How can you increase (1) space in your working memory, (2) your relevant factual knowledge, and (3) your relevant procedural knowledge? You may recall that the cognitive principle guiding our discussion in Chapter Five was *It is virtually impossible to become proficient at a mental task without extended practice.* Your best bet for improving your teaching is to practice teaching.

The Importance of Practice

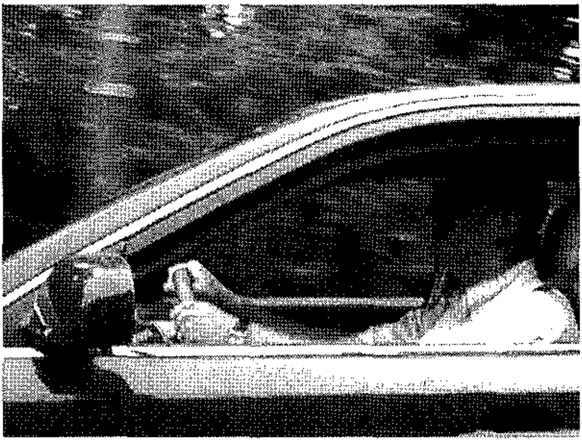


FIGURE 2: I have a great deal of driving experience, but I have practiced driving relatively little and therefore haven't improved my driving much in the last thirty years.

Until now, I have been a bit casual in how I have talked about practice. I have made it sound synonymous with experience. It is not. Experience means you are simply engaged in the activity. Practice means you are trying to improve your performance. For example, I'm not an especially good driver, even though I've been driving for about thirty years. Like most people my age I'm experienced—that is, I've done a lot of driving—but I'm not well practiced, because for almost all of that thirty years I didn't try to improve. I *did* work at my driving skills when I first got behind the wheel. After perhaps fifty hours of practice, I was driving with skill that seemed adequate to me, so I stopped trying to improve (Figure 2). That's what most people do for driving, golf, typing, and indeed most of the skills they learn.

The same seems to be true for teachers too. A great deal of data show that teachers improve during their first five years in the field, as measured by student learning. After five years, however, the curve gets flat, and a teacher with twenty years of experience is (on average) no better or worse than a teacher with ten. It appears that most teachers work on their teaching until it is above some threshold and they are satisfied with their proficiency.* It's easy to criticize such teachers and to think indignantly, "They should *always* strive to improve!" Certainly we'd all like to think that we are always seeking to better ourselves, but we also must be realistic. Practice, as I'm about to describe, is hard. It takes a great deal of work, and very likely work that infringes on time that might be spent with family or in other pursuits. But I am trusting that if you've read this far into the book, you are prepared to do some hard work. So let's get started.

FIGURE 3: Most of us treat Monopoly as a diversion, but serious players compete in tournaments and are highly skilled. That skill is developed through practice, and practice requires expert feedback. Ken Koury, pictured here, is a U.S. Monopoly player who has served as a coach at the national and international tournament levels.

First, we need to define *practice*. We've said that it's more than engaging in the activity; you also have to try to improve. But how? First, practice entails getting feedback from knowledgeable people. Writers seek criticism from editors. Basketball teams hire coaches. Cognitive scientists like me get written appraisals of our experimental work from expert colleagues. When you think about it, how can you possibly improve unless there is some assessment of how you're doing? Without feedback, you don't know what changes will make you a better cognitive scientist, golfer, or teacher (Figure 3.).

It's true that teachers get feedback from their students. You can tell if a lesson is going well or poorly, but that sort of feedback is not sufficient because it's not terribly specific. For example, your students' bored expressions tell you they aren't listening, but they don't tell you what you might do differently. In addition, you probably miss more of what's happening in your classroom than you think you do. You are busy *teaching* and don't have the luxury of simply *watching* what is happening in your classroom. It's hard to think about how things are going when you're in the middle of trying to make them go well! A final reason it's hard to critique your own teaching is that we are not impartial observers of our own behavior. Some people lack confidence and are harder on themselves than they ought to be whereas others (most of us, actually) interpret their world in

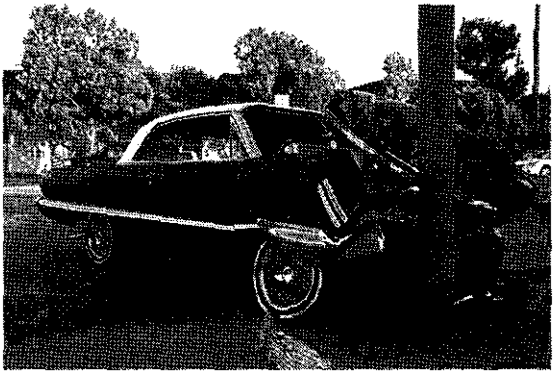
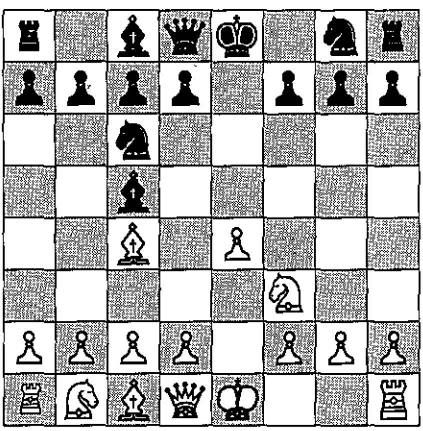


FIGURE 4: People who get in automobile accidents often blame the other driver. At http://www.car-accidents.com people describe accidents they have been in, and most protest that they were not at fault. For example, one driver claims, "The emergency services that attended the scene ruled it was my fault as I failed to give way to her vehicle (which is technically correct), but did not take into account my story."

ways that are favorable to themselves. Social psychologists call this the self-serving bias. When things go well, it's because we are skilled and hardworking. When things go poorly, it's because we were unlucky, or because someone else made a mistake (Figure 4).

For these reasons, it is usually quite informative to see your class through someone else's eyes.



The Giuoco Piano
(or Italian Opening)

FIGURE 5: Aspiring chess experts cannot simply play a lot of chess. They must also study the game, even memorizing standard game openings. If your opponent starts to play the Giuoco Piano, shown here, and you're unfamiliar with it, you're likely to fall into a trap and lose.

In addition to requiring feedback, practice usually means investing time in activities that are not the target task itself but done for the sake of improving that task. For example, aspiring chess players don't just play lots of chess games. They also spend considerable time studying and memorizing chess openings and analyzing the matches that other experts have played (Figure 5). Athletes of all sorts do weight and cardiovascular training to improve their endurance in their sport (Figure 6).

To summarize, if you want to be a better teacher, you cannot be satisfied simply to gain experience as the years pass. You must also practice, and practice means (1) consciously trying to improve, (2) seeking feedback on your teaching, and (3) undertaking activities for the sake of improvement, even if they don't *directly* contribute to your job. There are lots of ways you could do these things, of course. Here I suggest one method.

FIGURE 6: Tiger Woods is famous for working very hard on his golf game, including running and lifting weights, activities that are not direct practice for golf. At a tournament in Tulsa, Oklahoma, in 2007 the temperature hovered around 101 degrees. Woods was not disturbed by the heat, noting that he maintains a challenging training regimen. He commented, "You should always train hard and bust your butt." Thus, practice for Woods includes activities that are not obviously related to golf.

A Method for Getting and Giving Feedback

There is not, to my knowledge, a method of practice for teachers that has been rigorously proven to be effective. I'm going to suggest a method to get you started, but I encourage you to experiment. I also encourage you to think carefully about a few features of this type of practice that I think are bound to be important.

First, you need to work with at least one other person. Someone else will see things in your class that you cannot, simply because she is not you and thus can be more impartial. (Of course she also has a different background and experiences than you, and that helps.) Furthermore, as anyone who has exercised knows, having a buddy helps you to stick with a difficult task (Figure 7). Second, you should recognize that working on your teaching *will* be a threat to your ego. Teaching is very personal, so taking a close look at it (and inviting one or more other people to do the same) is scary. It's a good idea not to shrug off that concern ("I can take it!") but instead to put measures in place to deal with it.

FIGURE 7: Two heads are generally better than one, and the buddy system is commonly used by young students when they are out on a field trip, as well as by police officers, scuba divers, and firefighters.

Step 1: Identify Another Teacher (or Two) with Whom You Would Like to Work

Naturally it will help if this person teaches the same grade as you do. More important, however, is that you trust each other, and that your partner is as committed to the project as you are.

Step 2: Tape Yourself and Watch the Tapes Alone

There is a lot of value in videotaping your teaching. As I mentioned earlier, it's difficult to watch your class while you're busy teaching it, but you can watch a video at your leisure, and you can replay important parts. If you don't own a video camera, you may be able to borrow one from your school. You might want to send a note home with students to let parents know that their child is being videotaped, that the tapes are purely for your professional development and will not be used for any other purpose, and that the tapes will be erased at the end of the school year. (You should check with your principal on this matter.)

Simply set the camera on a tripod in a place where you think it will capture most of the class, and switch it on at the start of a lesson. The first few tapes you make will probably give you important information about logistical matters. You might not be able to tape every type of lesson. For example, you only have one camera so you'll be able to see only part of the classroom. Also, picking up audio is frequently difficult, so noisy participatory lessons may not work well.

I suggest that you first tape a lesson that you feel typically goes pretty well. It's not easy to watch yourself (and later to critique yourself), so stack the deck in your favor at first. There will be time enough later to examine the things you suspect you don't do so well.

You can expect it to take a class or two for your students to become accustomed to the idea of being videotaped, although this is generally not a concern for long. Then too, it will probably take a couple of tapes for *you* to become accustomed to hearing your voice and seeing yourself move on tape.†

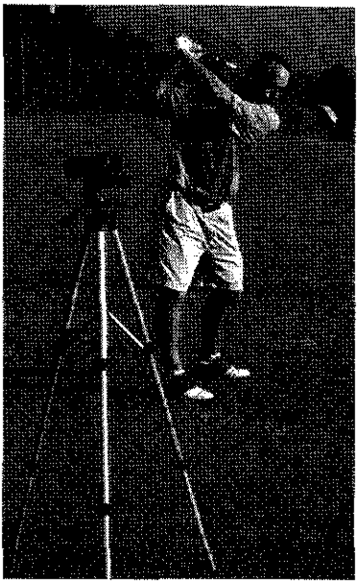


FIGURE 8: Avid golfers videotape themselves in an effort to learn more about their strokes. Initially that may seem odd: Don't they know what they're doing? To a surprising extent, no. A golfer's stroke is so practiced that it may feel quite comfortable, even though the golfer may, for example, be arching his back in a way that he knows is bad form.

Once you have these practical matters settled, you can focus on content. Watch these tapes with a notepad in hand. Don't begin by judging your performance. Consider first what surprises you about the class. What do you notice about your students that you didn't already know? What do you notice about yourself? Spend time *observing*. Don't start by critiquing (Figure 8).

Step 3: With Your Partner, Watch Tapes of Other Teachers

Once you have grown accustomed to watching videotapes of yourself, it's time to include your partner. But don't watch tapes of each other yet. Observe tapes of other teachers. You can find taped classrooms in several places on the Internet; for example, http://www.videoclassroom.org and http://www.learner.org.

The reason to watch tapes of other teachers first is to gain practice in constructive observation and commenting, and to get this practice in a nonthreatening situation. Further, you will also get a sense of whether you and your partner are compatible for this work.

What are you looking for on these tapes? It's not productive just to sit down and watch them like a movie, waiting to see what will happen. You should have a concrete goal, such as observing classroom management or observing the emotional atmosphere of the classroom. Many of the tapes featured on Web sites are there for a particular reason, so it will usually be clear why the person who posted the tape thought it was interesting.

This is your chance to practice observing and commenting on a classroom. Imagine what you would say to the teacher you observe. Indeed, imagine that the teacher is there in the room with you. In general, comments should have the following two properties:

1. *They should be supportive.* Being supportive doesn't mean you are there *only* to say positive things. It does mean that even when you are saying something negative, you are supporting the teacher you are observing. *The point of this exercise is not to "spot the flaw."* The positive comments should outnumber the negative ones. I know that principle seems corny, because when listening to positive comments a teacher can't help but think, "He is saying that only because he knows he is supposed to say something positive." Even so, positive comments remind the teacher that she *is* doing a lot of things right, and those things should be acknowledged and reinforced.
2. *They should be concrete and about the behaviors you observe, not about qualities you infer.* Thus, don't just say, "She really knows how to explain things"; instead say, "That third example really made the concept click for students." Rather than saying, "His classroom management is a mess," say, "I noticed that a lot of the students were having trouble listening when he asked them to sit down."

Step 4: With Your Partner, Watch and Comment on Each Other's Tapes

You should not undertake this step until you feel quite comfortable watching tapes of other teachers with your partner. This means you should feel comfortable in what you say *and* you should feel that your partner knows how to be supportive; that is, you should feel that you wouldn't mind if your partner's comments were directed to you instead of to the unknown teacher on the tape. The ground rules for commenting on the tapes of other teachers apply here as well: be supportive, be concrete, and focus on behaviors. Because this process is now interactive, there are a few additional things to think about (Figure 9).

FIGURE 9: When you watch and comment on videotapes of your partner teaching, it is very important to monitor both the content and the tone of what you say. Something that you may not mean as a criticism may sound like one, and most people's reaction would be simply to shut down.

The teacher whose tape is being viewed should set the goal for the session. She should describe what she would like the other teacher to watch for in the session. It is vital that the viewer respect this request, even if she sees something else on the tape that she thinks is important. If you present a tape hoping to get some ideas about engaging students in a lesson on fractions and your partner says, "Gee, I notice some real classroom-management issues here," you're going to feel ambushed, and you're not going to be motivated to continue the process.

What if your partner keeps wanting to work on trivial things and you notice that there are bigger problems that she's ignoring? If you and your partner make a habit of taping yourselves, there will likely be a time when this issue will come up naturally in the course of discussing something else. You and your partner also might consider agreeing that after viewing, say, ten tapes, each of you will suggest to the other something they might work on that hasn't come up yet.

A final point. The purpose of watching your partner teach is to help her reflect on her practice, to think about her teaching. You do that by describing what you see. Don't suggest what the teacher should do differently unless you are asked. You don't want to come off as thinking you have all the answers. If your partner wants your ideas about how to address an issue, she'll ask you, in which case you should of course offer any ideas you have. But until you're asked, remain in the mode of a careful, supportive observer, and don't slip into the role of the expert fixer, regardless of how confident you are that you have a good solution.

Step 5: Bring It Back to the Classroom and Follow Up

The purpose of videotaping yourself is to increase your awareness of what is happening in your classroom, and to gain a new perspective on what you are actually doing and why, and on what your students are doing and why. With that awareness will almost certainly come some resolve to make some changes. The way to do that is as follows: Make a plan that during a specific lesson you will do one thing that addresses the issue with which you are concerned. Even if you think of three things you want to do, do just one. Keep it simple. You'll have plenty of chances to add the other two things. And of course tape the lesson so you can see what happened.

The program I have sketched here is rooted in the cognitive principles I have described. For example, I emphasized in Chapter One that the most important limitation to thinking is the capacity of working memory. That's why I recommend videotaping—because it's difficult to think deeply about your teaching while you're actually teaching. Also, because memory is based on what we think about (Chapter Three), we can't expect to remember later a complete version of what happened in a class; we remember only what we paid attention to in class. In Chapter Six I said that experts see the world differently than novices do—they see deep structure, not surface structure—and the key reason they can see this way is that they have broad and deep experience in their field. Careful observation of a variety of classrooms will help you better recognize classroom dynamics, and careful observation of your own classroom will help you recognize the dynamics that are typical of your own teaching.

In Chapter Two I emphasized the importance of background knowledge to effective problem solving. Background knowledge means not just subject-matter knowledge; for a teacher it also means knowledge of students and how they interact with you, with each other, and with the material you teach. Careful observation, especially in partnership with another, well-informed teacher is a good method for gaining that background knowledge. Finally, Chapter Eight painted a hopeful picture of human intelligence—that it can be changed through sustained hard work. There is every reason to believe this is true of teaching.

Consciously Trying to Improve: Self-Management

I've mentioned three components of practice: getting informative feedback, seeking out other activities that can improve your skill (even if they are not practice of the skill itself), and consciously trying to improve your teaching. The last of these components sounds like the easiest to implement. "Sure, I want to improve. Let's go!" But how many of us have made a solemn New Year's resolution only to find ourselves in the second week of January saying, "You know, my birthday is February 4; February 5 would be a *great* time to get serious about this diet." Resolving to do something difficult is easy. Following through is not. Here are a few suggestions that might help.

First, it might help to plan for the extra work that will be required. In Chapter One I pointed out that most of us are on autopilot most of the time. Rather than think through the optimal thing to do moment to moment, we retrieve from memory what we've done in the past. Teaching is no different. It's to be expected that once you have gained sufficient experience you will teach on autopilot at least part of the time. There's nothing wrong with that, but serious work at improving your teaching means that you will be on autopilot less often. It's going to be tiring, and thinking carefully about things you don't do as well as you'd like to is emotionally draining. You may need a little extra support from your spouse and family. You may need to be more vigilant in scheduling relaxation time.

You will also spend more time on teaching. In addition to the hours spent at home grading, planning lessons, and so forth, now you will also spend more time than usual reviewing what you're doing well and poorly in the classroom, and planning how to do things differently than you've ever done them before. If you're going to spend an extra five hours each week (or three hours, or one hour) on teaching, where is that time going to come from? If you schedule extra time for this work, you are much more likely to actually do it.

Finally, remember that you don't need to do everything at once. It's not realistic to expect to go from wherever you are now to "great" in a year or two. Because you're not trying to fix everything at once, you have to set priorities. Decide what is most important to work on, and focus on concrete, manageable steps to move you toward your goal.

Smaller Steps

The program I've laid out is time consuming, there is no doubt. I can well imagine that some teachers will think to themselves, "In an ideal world, sure—but between taking care of my kids and the house and the million other things I'm *supposed* to be doing and am not, I just don't have the time." I absolutely respect that. So start smaller. Here are a few ideas for ways you can work on your teaching that are less time consuming.

Keep a Teaching Diary

Make notes that include what you intended to do and how you thought it went. Did the lesson basically work? If not, what are your thoughts as to why it didn't? Every so often take a little time to read past entries. Look for patterns in what sorts of lessons went well and which didn't, for situations that frustrated you, for moments of teaching that really keep you going, and so on.

Lots of people start a diary but then find it difficult to stick with it. Here are a few tips that might help. First, try to find a time of day when you can write and make it a time that you're likely to be able to maintain. (For example, I'm a morning person, so I know that if I planned to write just before bed, it would never happen.) Second, try to write *something* each day, even if it's only "Today was an average day." The consistency of pulling out the diary and writing something will help make it a habit (Figure 10). Third, remember that this project is solely for *you*. Don't worry about the quality of the writing, don't feel guilty if you don't write much, and don't beat yourself up if you miss days, or even weeks. If you do miss some time, don't try to catch up. You'll never remember what happened, and the thought of all that work will prevent you from starting again. Finally, be honest both in your criticism and in your praise; there is no reason not to dwell on moments that make you proud.

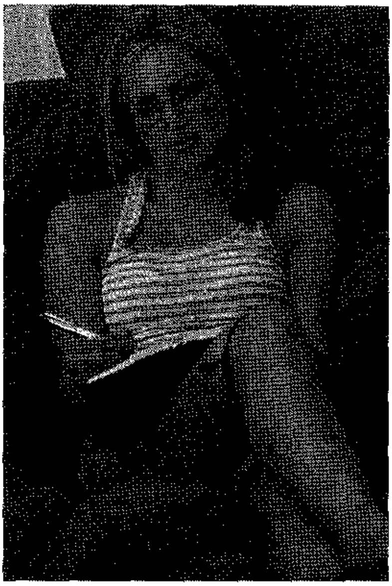


FIGURE 10: Self-reflection is an important part of the effort to improve any skill. Maintaining a diary is a great way to be reflective.

Start a Discussion Group with Fellow Teachers

Get a group of teachers together for meetings, say, once every two weeks. There are at least two purposes to such groups. One purpose is to give and receive social support. It's a chance for teachers to grumble about problems, share their successes, and so forth. The goal is to feel connected and supported. Another purpose, not completely independent of the first, is to serve as a forum for teachers to bring up problems they are having and get ideas for solutions from the group. It is a good idea to be clear from the start about whether your group is to serve the first function, the second, or both. If different people have different ideas about the purpose of the group, hurt feelings are likely. If your group is very goal oriented, you can also have everyone read an article in a professional journal (for example, in *American Educator, Educational Leadership,* or *Phi Delta Kappan*) for discussion.

Observe

What makes students in the age group you teach tick? What motivates them, how do they talk to one another, what are their passions? You probably know your students pretty well in the classroom, but would your students say they are "themselves" when they are in your classroom? Would it be useful to you to see them acting in ways that are not contrived for the classroom or when they are surrounded by a different group of children?

Find a location where you can observe children in the age group you teach. To observe preschoolers, go to a park; to watch teenagers, go to the food court at the mall. You'll probably have to go to a different neighborhood or even a different town, because this exercise won't work if you're recognized.‡ Just watch the kids. Don't go with a specific plan or agenda. Just watch. Initially, you probably will get bored. You'll think, "Right, I've seen this before." But if you keep watching, really watching, you will start to notice things you hadn't noticed before. You'll notice more subtle cues about social interactions, aspects of personality, and how students think. Allow yourself the time and space simply to observe, and you will see remarkable things.

Notes

*Naturally there is variability. There are teachers who always strive to improve and there are teachers who get lazier as time passes. Teachers are no different from anyone else. Another possibility is that, at least for some teachers, improving is difficult because changes in district policy, leadership, and so on make the job something of a moving target.

†My father started to go bald at about age forty. He lost hair mostly on the back of his head and it wasn't very noticeable from the front, but by the time he was fifty-five the bald spot was pretty sizable. At that time he saw a photograph of a crowd of people, including himself with his back to the camera. He pointed to himself and said, "Who is that bald-headed gentleman?" It's not easy seeing what the camera sees.

‡The wife of a friend of mine teaches seventh grade. My friend told me that walking downtown with her is like being accompanied by a celebrity—everyone knows her, and even the "cool" kids greet her and are excited to get a greeting in return. He also mentioned that she's not reluctant to use her authority. "She puts on that teacher voice and tells kids who are misbehaving to knock it off, and they always do."

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http://www.myteachingpartner.net. My Teaching Partner is a project to help teachers become more reflective about their practice. It involves taping one's class and then talking with a consultant. This project is based at my institution, the University of Virginia, and the guidelines for the project provided much of the framework for the method described here.

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