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Thinking Frames

Schools can help students become better thinkers by deliberately adding to their repertoire of frames: tactics and strategies invented by human beings to organize their thinking.

In an age when there are too many things to know, it almost seems that there are too many ways to think as well. Those concerned with improving students' thinking face a razzle-dazzle of very different advice from different quarters. We are encouraged to boost students' IQs, teach learning skills, foster moral development, enhance critical thinking, nourish problem-solving abilities, cultivate formal reasoning, inspire creativity, impart strategies for more mindful reading and writing, and so on. We are urged to undertake these missions in a dismaying variety of ways: escalating sequences of exercises, training for self-reflection, diagnostic testing, one-on-one or one-on-a-few tutoring, small-group learning, stand-alone courses in thinking skills, integration of thinking skills into the subject areas, and more.

There is a great irony in all this. Recognition of the contemporary problems of knowledge glut and knowledge obsolescence has in part inspired the current attention to the development of students' thinking. Students need such skills to manage the flood of information in the modern world. Yet, with all the available philosophies and curriculum packages for developing thinking, it seems that this solution falls victim to the very problem it aims to solve. The cornucopia of options almost paralyzes. How can we make sense of the confusion? Are there principles that reveal some unity among the many current approaches? Are there standards by which we can appraise and select?

Of course, we must be wary of a misguided effort to oversimplify. Human thinking *is* complex and many-faceted. Instruction designed to foster thinking and learning skills might address a number of different aspects of skill. Nonetheless, there is some unity and generality that can aid teachers and administrators in making the decisions that have to be made if we are to take the opportunity of developing students' thinking. The framework presented here focuses on three key questions:

- What is thinking "made of" such that it might be improved?
- By what sort of learning process can people learn to think better?
- How can we tell whether a particular approach to teaching thinking is a good bet?

Intelligence as Power, Tactics, and Content

Any perspective on the teaching of thinking must confront the problem of intelligence. After all, most of us have been taking intelligence tests, worrying about our own intelligence, and wondering about the intelligence of others from an early age. Are those we would like to teach to think better already operating at their intelligence ceilings? Is intelligence the sort of thing that can be improved?

A good first step in confronting such questions is to avoid an overly narrow conception of intelligence. When many people speak of intelligence, they mean the sorts of abilities measured by IQ tests. But there is a more commonsensical meaning of intelligence, the meaning intended when we say informally that so-and-so is intelligent. We make such remarks of people who learn rapidly, plan ahead, speak well, make sound decisions, approach problems systematically and effectively, and so on. Note that this broad and informal sense of intelligence does not logically imply an exceptionally high IQ. Whether IQ accounts for it is an empirical question. Note also that intelligence in the broad and informal sense is just what we want to improve if we want to improve thinking.

The key question becomes: What psychological factors contribute to intelligence in this broad sense? Different contemporary psychologists offer three contrasting answers, which we might call "power," "tactical," and "content" theories of intelligence. A power theory of intelligence holds that intelligence depends on the neurological efficiency of the brain as an information processing device. Jensen (1984) presents exactly this view, arguing that IQ measures, albeit indirectly, that basal efficiency. Most investigators with a power view of intelligence hold that learning does not affect this power very much, although nutrition and mental stimulation over a period of many years may have some impact. By and large, one's intelligence is determined by one's "original equipment."

Another contemporary view argues that intelligence is a matter of tactical repertoire. Those who think better do so because they know more tactics about how to use their minds well (Baron 1978, 1985a). For example, people identified as somewhat retarded or as slow learners typically display not just poor performance but tactical deficits; they do not have the strategies for memorizing, solving problems, and so on, that their better-performing peers have acquired. Teaching such individuals strategies for particular performances such as memorizing or reading can improve their performance dramatically, sometimes almost eliminating their shortfall (Palinscar and Brown 1984). Such results argue against the notion that intelligence is organically determined and for the notion that it depends on learning.

Still a third view maintains that intelligence depends principally on a rich knowledge base in the domain in question. General strategic knowledge, in this view, gives little real leverage. Rather, mastery of particular areas like mathematics, physics, social skills, and so on, underlies effective thinking in those areas. Evidence for this "content" perspective on intelligence comes from various sources that have discussed how much good problem solving in an area depends on a rich knowledge base (e.g. Chase and Simon 1973; Chi, Fetovich, and Glaser 1981; Glaser 1984; Schoenfeld and Herrmann 1982).

Confronting this dilemma between three very different theories of intelligence, we have to ask the natural question: Who is right? The dilemma is acute, because proponents of all three positions have evidence that must be taken seriously. The only proper resolution seems to be recognition that all are right: intelligence is not a simple thing but a compound of influences. The circumstances can be summarized with this metaphorically intended equation:

Intelligence =
Power + Tactics + Content

This may clarify the nature of intelligence by acknowledging its multiple nature. But how does it help us think about the question we started with: "What is thinking made of such that it might be improved?" Perhaps this analysis only makes the problem more confusing.

On the contrary, this understanding of intelligence points in a clear direction: develop students' tactics. The power side of intelligence does not lend itself to much improvement through instruction. But on the plus side, as the equation indicates, intelligence involves a lot more than power. Perhaps we can improve thinking by teaching content. But we already try to teach considerable content in schools, with dissatisfying results. Indeed, many educators aver that we try to teach too much content. This leaves the development of students' tactical repertoires as the natural window of opportunity for the improvement of thinking.

With that basic message conveyed, a clarification is in order. What is the difference between tactics and content? Indeed, no hard line separates the two. Both are learned; both are knowledge. Rather, we do best to imagine a continuum. At the tactical end are very general principles that apply to many domains. At the content end are very specific bits of knowledge relevant to particular subject matters, such as the date Columbus discovered America or the multiplication table. In the middle appears knowledge of intermediate generality—tactics for solving mathematical problems specifically, for instance. "Developing students' tactics" simply means paying much more heed to the middle and tactical end of the continuum than we usually do.

The Unnaturalness of Good Thinking

Tactical intelligence is not a natural thing. It is a bag of tricks—tactics, strategies, techniques, methods, or whatever you want to call them. I prefer the term "thinking frames" to refer collectively to the various tricks that make up tactical intelligence. Now this notion that intelligence reflects artifice in large part, and that we can enhance students' thinking by teaching them tricks, may ring false to some.

Consider these reservations, for instance. Fluent thinkers have no great consciousness of a repertoire of thinking frames; they simply think, as naturally as you might walk down the street. Moreover, this notion of frame repertoires seems suspiciously modern. Many people throughout human history have done some excellent

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thinking. How have they managed up to now without frames? Finally, in an overtechnologized age, we do well to be wary of the notion that good thinking is so artificial an undertaking.

These concerns are legitimate, but they have ready answers. If fluent thinkers are not very self-conscious about their thinking, this need not in itself cast doubt on the importance of thinking frames. Tactics for thinking, like any other pattern of human conduct, become automatic with practice. The expert has an internalized frame repertoire that functions spontaneously, without much deliberate attention. As to how good thinkers have managed up to now without frames—they have not. To be sure, the term "frames" is new, but the notion of tactics for accomplishing various intellectual and other tasks is not. Indeed, people have always invented tactics to aid their thinking. These frames become part of our intellectual heritage and inform our thinking. Aristotle, for instance, formalized reasoning by defining a range of syllogistic forms. Although the relevance of syllogistic forms to everyday reasoning is debatable, these patterns can guide our thinking in certain formal contexts. Bacon and others after him sought to define the patterns of thinking involved in scientific inquiry. Ramifications of what has come to be called the philosophy of science figure today in the thinking of sophisticated scientists. In general, a look at any particular domain reveals a host of frames provided by tradition that guides thinking in those domains.

Now let us consider the broadest and vaguest of the concerns mentioned: the artificiality of it all. Is it really the case that effective human thinking rests in large part on artifice? Indeed, yes. In fact, natural human thinking, which follows its own course without any strong guidance from frames, often falls prey to human weaknesses that undermine it. Good thinking is a highly unnatural act, and the better for it. Consider these examples.

• *Biased versus evenhanded reasoning*. People often reason about issues in egocentric ways that neglect other points of view. What is perhaps less often recognized is the pervasiveness and persistence of this tendency. In my own research examining the impact of education on informal reasoning (Perkins 1985), I have found that conventional education at the high school, college, and graduate school level has hardly any effect on the development of general reasoning abilities. Underexploration of issues and neglect of the side of the case opposite that of the reasoner emerged as serious problems in reasoners with more education as well as those who were less educated. The problem of bias is confirmed in numerous sources, for instance, the notion of egocentricity in human development biased processing of evidence that tends to dismiss counterevidence and general phenomena of functional fixedness and Einstellung that evidence the human tendency to stick stubbornly to a pattern (e.g. Adamson 1952; Luchins 1942; Nisbett and Ross 1980; Ross and Anderson 1982).

Such evidence plainly argues that evenhanded reasoning about a situation with more than one side does not come naturally. Appropriately enough, therefore, a number of approaches to the development of thinking skills offer thinking frames that urge a more balanced exploration of issues. For example, de Bono's CoRT (1973-75; 1983) program includes such operations as Consider All Factors (CAF) and Other Point of View (OPV). The guided design strategy for decision making involves an evaluation phase that emphasizes evenhanded evaluation (Wales and Nardi 1984; Wales and Stager 1974). Likewise, the decision-making sequence in Odyssey stresses casting a wide and objective net for the factors that may figure in a decision (Feehrer and Adams 1986).

• *Problem solving versus problem finding*. People tend to be solution-minded. Given a commonsense problem, they start to think of possible solutions right away, without considering the nature of the problem itself. Sometimes this works out well enough, but often the rush to a solution proves to be a trap. The solutions one thinks of reflect tacit assumptions about the nature of the problem that exclude other, better solutions. Research on creative artists and scientists, however, reveals their savvy about this natural pitfall of human thinking. They tend to be problem finders, considering how to define and represent a problem, how it might be represented in quite a different way, and even whether the problem at hand is worth solving at all (Getzels and Czikszentmihalyi 1976; Mansfield and Busse 1981).

Consequently, solution-mindedness, like biased thinking, has become a target of efforts to teach thinking skills. For example, Bransford and Stein's (1984) "IDEAL" steps for problem solving provide a thinking frame that includes explicit attention to identifying and defining problems. Schoenfeld's (1980) approach to the development of mathematical problem-solving abilities asks students to explore a problem in several ways before seeking solutions. The guided design approach to problem solving and decision making calls for several steps of problem defining (Wales and Nardi 1984; Wales and Stager 1978). The Odyssey materials for inventive thinking focus students on the purposes of the design they are trying to invent, asking them to elaborate on the purpose before proceeding to a solution (Perkins and Laserna 1986).

• *Knowledge as information versus knowledge as invention*. Students and teachers alike typically treat abstract knowledge as information. Newton's laws or the Bill of Rights are given as facts of the world to be learned as such. Seemingly direct and efficient, this attitude unfortunately undermines learners' feel for the nature of knowledge and the enterprise of knowledge building. Newton's laws were made up by Newton to explain a range of natural phenomena; the Bill of Rights was made up to parry certain infringements on liberty that history had shown were likely. Both can be seen in means-ends terms, as highly motivated acts of invention influenced in numerous ways by their historical contexts.

As with the pitfalls mentioned earlier, there are thinking frames to forestall the human tendency to treat knowledge merely as information. For instance, I have developed an approach to teaching and learning called "knowledge as design," which treats all knowledge and products of mind as inventions designed to serve purposes (Perkins 1984, 1986). One would ask of Newton's laws, for example, (1) what job are they meant to do, (2) how are they structured, and (3) what arguments show that their structure serves their purpose well? The same sorts of means-end questions apply to the Bill of Rights, the periodic table of elements, the law of supply and demand, and the Pythagorean theorem, for instance. Conventional education commonly answers question 2 about structure but neglects 1 and 3, which motivate and justify the structure.

In summary, examples such as these remind us that very often good thinking is indeed not natural. Our tendencies to defend our own images of the world, to get things over with, and to avoid complexity lead us into biased reasoning, solution-mindedness, and treating knowledge merely as information, just to mention three natural trends in human thought. Better thinking is in large part a matter of guarding against such trends by means of thinking frames that redirect our thinking into more fruitful patterns.

Thinking Frames Defined

So far, the notion of thinking frames has been used informally and more or less interchangeably with tactics or strategies. Yet there is a reason for introducing this new term: a broader conception of tactical intelligence results, one more suited to the complex reality of human psychology.

A definition is a good place to begin: *a thinking frame is a representation intended to guide the process of thought, supporting, organizing, and catalyzing that process*. This representation may be verbal, imagistic, even kinesthetic. When well-practiced, it need not be conscious. A thinking frame, in order to organize our thinking, includes information not only about *how* to proceed but *when* to proceed in that way.

For example, all the programs discussed in the previous section suit the definition. They all offer guides in verbal form advising us when and how to conduct our thinking so as to evade certain pitfalls. The metaphorical sense of "frame" deserves comment, too. A thinking frame provides a frame supporting our thoughts much as the frame of a building supports its walls and floors. Or a thinking frame organizes our thinking much as the frame of a viewfinder gives focus and direction to our compositions as we snap photos. Notice that a thinking frame does not define in advance the answer we will get; it is up to us to fill in the content of a frame. Frames are not formulas, like the algorithm for long division. Rather they are catalysts that stimulate us to invent answers.

"A thinking frame is a representation intended to guide the process of thought, supporting, organizing, and catalyzing that process."

But why speak of thinking frames rather than simply tactics or strategies? Primarily to broaden our conception of tactical intelligence. "Tactics" and "strategies" *tend* to mean stepwise actions literally described in pursuit of a given end: first you do this, then you do this, then you do this. But we organize our thinking by many frames that do not have this form. Here are some examples.

- *Product frames versus process frames*. Many thinking frames organize the products we produce and only indirectly the process by which we produce them. Consider, for instance, the topic sentence-elaboration structure of paragraphs, a frame routinely taught in elementary school. This helps us to write in an organized way, but it does not tell us what to do first. We *may* write the topic sentence first, but we can also go back and add it later, after the composing of the body of the paragraph has sharpened our sense of what we want to say. Likewise, essay formats like thesis-argument-counterarguments-rebuttal-summary give a form to essays without demanding that the parts be written in that order. Sonnet, ballad, haiku, sonata, fugue, and rondo are forms in literature and music that frame the process of composing. They give the process organization and direction without, however, specifying how to proceed in a stepwise fashion.

- *Style frames versus organization frames*. Some thinking frames concern not the molar organization of what we do, but its texture or grain. For instance, in sitting down to write, we may say to ourselves, "Be precise" or "Be imaginative." This often succeeds in creating a mental set that leads us to approach the task in a certain manner. When we say such things, we are not giving ourselves a step-by-step recipe to follow. Rather, we are attepting to proceed in a certain style moment to moment, always precise, always imaginative in a way that pervades our actions. Indeed, style frames correspond to what psychologists commonly call cognitive style, which some argue is a key aspect of intelligence (cf. Baron 1985b). Our use of prescriptions like "Be precise" shows that cognitive style is not merely a matter of individual differences. We can *change* cognitive styles to some extent to suit the task, much as one dresses differently for the picnic or the ball.

- *Analogical versus literal frames*. When we think of tactics, we usually think of advice that prescribes literally what we ought to do. However, in many contexts, analogies provide a powerful guide to behavior. For instance, Howard (1982) writes about the analogies teachers of singing use to help their students grasp subtleties of managing their voices. You may be asked to sing through the top of your head, for example, an act impossible to do literally but an analogy that can help a young singer to achieve a certain effect.

The terms tactic or strategy, interpreted generously, encompass all this variety. But the variety is not usually thought of when we speak of tactics or strategies. In stressing tactical intelligence and its improvement, we have to be careful about too narrow a construal of tactical intelligence that neglects many of the powerful ways in which human beings organize their thinking. Indeed, most of the packaged programs for developing students' thinking focus on tactics in a fairly narrow sense. With this hazard in mind, the term "thinking frames" serves as a more emphatically inclusive way of speaking about tactical intelligence.

How Thinking Frames Are Learned

Ideally we would only have to tell youngsters about a particular thinking frame for them to use it from then on faithfully and artfully to empower their thinking. But anyone who has dealt with education can recognize how unrealistic this is. Learning is a process full of pitfalls, and the learning of higher-order mental skills may be all the more so. If the development of students' frame repertoires is the objective, what process of learning must occur, where is it likely to go wrong, and what can be done about that?

It is useful to identify three distinct aspects in learning a thinking frame: acquisition, internalization, and transfer. Briefly described, ***acquisition*** refers to becoming acquainted with a frame; ***internalization*** to practicing it enough so that one becomes fluent and spontaneous with it; and ***transfer*** to using the frame widely, beyond its immediate context of learning. Notice that these are called aspects rather than steps of learning: although the beginning of acquisition must of course come first, attention to internalization and to transfer can commence almost at once. The three deserve separate examination, not because they necessarily constitute steps, but because they pose rather different pedagogical problems and pitfalls.

- *Acquisition*. How might a learner acquire a frame in the first place? We might teach the learner the frame directly, or the learner might invent it autonomously. There are also in-between possibilities. Perhaps, for instance, a teacher sets a good example by modeling desired behaviors, and a student invents appropriate frames guided by the hint of the teacher's modeling. This continuum, from direct instruction to autonmous invention, points to an important opportunity. We need not always teach frames directly. Indeed, many educators regard with distaste the notion of feeding students a repertoire of formulas, and it is certainly important that people learn how to discover for themselves frames that may empower them.

Unfortunately, a pitfall comes with the opportunity. Students faced with a task involving higher-order thinking and even with models of appropriate behavior often *do not invent* for themselves frames that could empower them and therefore do not improve at all (e.g. Schoenfeld 1979). It would be nice if an intellectually enriched environment would lead most students to discover and imbibe its spirit, but this simply does not happen.

> **"Since some frames are quite subtle and difficult to discover by oneself, a certain amount of direct instruction almost certainly is desirable."**

One solution is to teach directly the frames you want students to learn. Indeed, since some frames are quite subtle and difficult to discover by oneself, a certain amount of direct instruction almost certainly is desirable. However, direct instruction is not the only recourse. Short of that, we can directly provoke students to think strategically about their own behavior and to try to invent frames. We can, for instance, ask them point-blank to investigate their own behavior, list the strategies they implicitly use in handling a particular task, and try to improve those strategies. If we want to teach frames by discovery, some sort of direct provocation seems essential.

- *Internalization*. Internalization means practicing the application of a frame until it becomes fluent and spontaneous and no longer requires much deliberate attention to use. It is only common sense that an internalized frame does its job better, but there is a deep psychological reason for this. We can only hold a few pieces of information in our short-term or working memory at a time (e.g. Brainerd 1983; Case 1984; Miller 1956). When we initially learn a frame, the frame itself takes up much of our working memory, so we cannot apply it to very complex problems because we cannot hold them in mind. Fortunately, practice results in automatization of the frame, which drastically reduces its demands on working memory. For instance, those who have studied foreign languages will remember how, at first, one has to think about the grammar as one uses it; later, with practice, one just functions spontaneously according to the grammar. In short, practice liberates one's working memory from the load of the frame itself and permits one to address complex problems with it. So a frame does not come into its full power until it is internalized (Brainerd 1983; Case 1984; Bloom 1986).

The pitfall here is that many instructional efforts to develop students' thinking do not provide nearly enough practice to internalize frames. Others provide practice but escalate the difficulty of the problems too quickly. Remember that initially the frame takes up much of one's working memory. This means that practice problems can easily get complex enough to overflow the remainder, so the learner cannot handle the problem and consequently gets no benefit from the practice.

One remedy here is to provide plenty of "trivial practice," practice on problems that are quite easy but that give learners the opportunity to internalize the frame. Another is to provide memory support for the frame—posters on the wall, crib sheets for the students—and encourage students to use these heavily during the learning process so they will not have to hold so much in mind at once. The caution here is that one must then "fade" these supports so that the frame becomes thoroughly internalized in the long term. Whatever the particular solution, the main point is to face up to the problem: the frame must become internalized to do its job, and instruction often does not provide ways for this to happen.

- *Transfer*. Transfer means that the learner can use, and thinks to use, the frame in contexts remote from the context of learning. It would be convenient if people automatically carried over to other relevant contexts whatever they learned in a particular context. Unfortunately, a number of findings in recent years have warned that transfer often does not occur spontaneously (e.g. Belmont, Butterfield, and Ferretti 1982; Pea and Curland 1984; Scribner and Cole 1981). On the contrary, learning tends to become context bound or "contextually welded" to the learning situation. Sometimes students do not make the most obvious transfers to closely related situations. Since transfer cannot be relied upon to happen by itself, we *must teach for transfer*.

How do we do this? Many approaches can help. One is to make students mindful of the problem of transfer and encourage them deliberately to seek applications of what they have learned in remote contexts. This can be done directly through assignments. Another related tactic urges students to pay heed to their own mental processes and become conscious and strategic in selecting approaches to problems (Belmont et al. 1982). Also, we can deliberately include a great variety of examples in instruction, examples that range well beyond the usual, reaching outside the classroom or into different subject areas. A more detailed exploration of the problem of transfer can be found in Saloman and Perkins (1984) and Perkins and Saloman (in press). As with internalization, the main point is that instruction must confront the problem of transfer and deal with it one way or another in order to be effective. Regrettably, many efforts to teach thinking do not emphasize transfer, blithely presuming that it will happen by itself.

Decisions about Teaching Thinking

We began with a problem: the cornucopia of opportunities and options facing anyone concerned with developing students' thinking. Acknowledging that many facets of thinking invite development, we sought an organizing framework that could make sense of the variety and aid in making decisions.

So far, answers have been offered to two of the questions raised at the outset. *What is thinking made of such that it might be improved?* In significant part, good thinking is made of thinking frames that empower us to think better by organizing, supporting, and catalyzing our course of thought. The development of learners' frame repertoires is the natural window of opportunity for teaching thinking, in contrast either with improving the power side of intelligence, which may be impossible, or the content side of intelligence, which we already try to do without being satisfied. *By what sort of learning process can people learn to think better?* Learning thinking frames requires attention to acquisition, internalization, and transfer, all three of which present pitfalls that can prevent effective learning.

"Creative artists and scientists . . . tend to be problem finders, considering how to define and represent a problem, how it might be represented in quite a different way, and even whether the problem at hand is worth solving at all."

The third question turns directly to the dilemma of the educational decision maker: *How can we tell whether a particular approach to teaching thinking is a good bet?* Of course, the answer to this query lies in the responses to the first two, converted to critical principles for assessing an approach. Imagine that you are a teacher or administrator pondering how to improve the thinking of your students. You are considering a number of packaged programs. You also are exploring whether and how to design your own program to infuse the teaching of subject matters with attention to higher-order thinking. What broad critical questions can you ask yourself about a candidate, packaged or home-grown, to appraise its chances of success?

First of all, you can consider the content of the instruction.

- *Frame content*. Recall that the power side of intelligence does not lend itself to improvement. "Mental muscle building" approaches, which stress extensive intellectual exercise without teaching or directly provoking students' invention of frames, are likely to fail. Bet on frames.

Information on different frames useful for teaching thinking of various sorts can be found in such syntheses as Baron 1985a; Chipman, Segal, and Glaser 1985; Costa 1985; Segal, Chipman, and Glaser 1985; Hayes 1981; and Nickerson, Perkins, and Smith 1985).

- *Varied frames*. I emphasized earlier that frames come in many kinds, going well beyond stepwise strategies. Does the approach include a rich range of frames—process and product, organization and style, and so on?
- *Effective, relevant frames*. Of course, not all frames are effective and relevant, any more than all gadgets are well-designed and useful. Do you have reasons from personal experience or research to believe the frames in the approach are effective? Do the frames implicitly or explicitly include *when* information as well as *how* information? Do they speak to significant problems of human thinking, such as the problems of bias, solution-mindedness, and knowledge as information?

Just as important as content is the method of instruction. You can ask critical questions like these:

- *Acquisition*. Does the approach teach frames directly or directly provoke learners' invention of frames? If not, if it merely involves an enriched context, many learners are likely not to discover the frames for themselves.
- *Internalization*. Does the approach offer enough and easy enough practice to help students internalize the use of the frames and avoid the working memory bottleneck, so that the frames come into their full power?
- *Transfer*. Does the approach attend explicitly to the problem of transfer, drawing students' attention to the potential breadth of application of the frames and encouraging them to carry their frames far beyond the context of instruction?

Any effort to develop thinking involves a host of design decisions, and these six principles speak only to certain of them. Nonetheless, they have some power. Many commercial programs and many home-grown approaches to the teaching of thinking blatantly violate one or more of the principles. Besides filtering out approaches that have several flaws, it is possible to use the principles to prescribe repairs in a generally sound approach. For instance, if an approach neglects transfer or escalates the difficulty of practice examples too quickly, you may be able to add attention to transfer and supply practice examples that pose a more manageable challenge.

To apply such principles as a filter or guide to repairs is, of course, to be tactical. Indeed, the perspective on thinking and its development presented here lives up to its own philosophy. The formula *Intelligence = Power + Tactics + Content*, the concept of thinking frames, the model of learning a frame by way of acquisition, internalization, and transfer, and the critical principles just set forth are all themselves frames—thinking frames that can organize and catalyze our thinking about the teaching of thinking. For a very long time, the invention not only of tools but of tools to make tools has been a tactic of the human race. In developing frames for thinking about other frames, we extend that tactic to the domain of the mind itself.☐

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