Common Sense About Teaching Thinking Skills

A sound K-12 program in teaching for thinking requires attention to the learning environment, teaching strategies, and coordination throughout the curriculum.

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Although many school curricula claim to teach thinking skills, in reality few do. True, most texts and teachers frequently have students engage in exercises that supposedly require them to use selected thinking skills, but these teachers and texts usually fail to provide explicit instruction in what these skills are and how to employ them. Many teachers and texts also fail to devote continuing attention to each skill, erroneously assuming one “exposure” is enough for a skill to “catch.” These failures doom most students to hit-or-miss learning of thinking skills and practically guarantee less-than-adequate performance on common measures of skill competency. Any school program that hopes to help students learn thinking skills must provide direct and continuing instruction in how to execute these skills as part of a multi-grade, sequential skill program.

Teachers can go a long way toward ensuring their success at teaching thinking skills by attending to three essential components: (1) the learning environment, (2) the strategies and methods used to provide instruction, and (3) the coordination and structure of skill teaching throughout the entire curriculum. These three features are the foundations of effective instruction in thinking skills at all grade levels, K-12 and beyond.

A Supportive Learning Environment

A learning environment supportive of thinking is essential for effective teaching—and learning—of thinking skills. In such an environment, student thinking occurs frequently, learning activities regularly require student thinking; and students receive explicit, direct instruction in how to engage in thinking.

Classrooms that welcome student thinking provide the reinforcement and support that encourage students to “risk” thinking. Such classrooms help students feel free to challenge, question, invent, and guess. They are typified by considerable student-to-content and student-to-student interaction. Information processing, rather than information receiving, is the major activity.

Teachers also need to conduct lessons that require students to:

- Compare, analyze, and judge the logic of arguments, the accuracy of hypotheses, and the adequacy and accuracy of evidence given in support of generalizations.
- Invent or discover relationships among data.
- Infer and then test inferences.

Such lessons seek goals beyond simply learning content. They require students to process what they read, hear, see, and feel in order to give it new meaning.

But a classroom climate that is conducive to student thinking and learning activities that require students to think are not enough to develop student proficiency in thinking skills. The most crucial ingredient is direct instruction in the nature of specific thinking skills and how to use them.
Research suggests that skills teaching should be systematic, direct, integrated, and developmental.

Effective Skill Teaching Strategies
Research is inconclusive about the best way to teach thinking skills. This is especially true of one of the most commonly accepted approaches to skills teaching—the use of structured hierarchies of teacher-made questions. For every set of studies showing that questioning patterns improve student thinking, there is another set that suggests they have no significant effect. Moreover, reliance on such a technique fosters the learner dependency that instruction in thinking skills is designed to end.

Research does, however, suggest some useful basic principles about skills learning and teaching. In general, it suggests that skills teaching should be systematic, direct, integrated, and developmental.

Systematic Instruction. Thinking skills instruction may best proceed through four stages—readiness, introduction, reinforcement, and extension—as students move through a course or curriculum. A well-developed thinking skills program provides formal instruction in a limited number of specific thinking skills and proceeds through these four stages as students move upward through their K-12 programs.

To develop readiness for learning a skill, teachers can engage students in using the skill as best they can, concentrating on the substantive results of its use rather than on the skill itself. For example, before detailing the skill of detecting bias in data, a teacher might have students pick out examples of bias...
in a reading assignment and focus on what these examples reveal about the author rather than on how the students identified the biases. Repeated periodically with a variety of content examples, such readiness activities help create a receptivity to learning the skill—almost a "need to know." They also provide experiential referents. But they do not constitute instruction in the skill itself.

In introducing a thinking skill, teachers should provide specific instruction, carefully and repeatedly delimiting the components of the skill and providing examples of how the skill is used. The key to such instruction is focus on the skill itself rather than on the knowledge produced by its use. Continued student analysis, application, and discussion of the procedures and rules by which a thinking skill is used make it a subject of constant attention. At this phase of instruction it should be clear to the student as well as the teacher that the skill is the major goal of their learning activity.

Once a thinking skill has been introduced and students are somewhat familiar with it, teachers can provide reinforcement through repeated practice, guided by explicit instruction and review where appropriate. This may take place over a period of weeks, months, and even years as students practice using the skill to accomplish specific content-related tasks. However, such reinforcement is not accomplished simply by using conventional fill-in-the-blank exercises or by writing answers to end-of-chapter "critical thinking" questions. Unless the teacher or the instructional material provide instructive guidance in how to use the skill as well as immediate remediation where it is called for, such devices simply test skills rather than teach them. To promote learning, skill practice should serve as the basis for explicit student reflection and discussion of the procedures they employ as they use the skill. For best results, skill reinforcement requires application of the skill to new data, coupled with teacher instruction, and reflection on the skill itself.

Finally, teachers need to extend the use of thinking skills beyond the type of content in which the skills are formally introduced and practiced. If left to themselves, students are usually reluctant or unable to transfer skills learned in one type of content or with one media to another type of content or media. This is partly because most skills are tied closely to the context and type of data in which they are first introduced. Also, different teachers, texts, and subjects tend to use different terms to describe essentially identical thinking skills. What to reading teachers are "critical reading" skills, social studies teachers customarily call "critical thinking" and language arts teachers call "analysis." The direct teacher instruction in how to apply a previously learned skill to new forms of data, content, or media is indispensable for students to broaden their knowledge and mastery of thinking skills.

In sum, teaching a thinking skill consists of purposeful introduction carried out over a period of time—instruction that introduces students to a skill and then provides guided practice and reinforcement in using the skill in a variety of settings with a variety of media. Students do not learn any thinking skill well simply by employing it unguided. Nor do they learn any skill from only one or two experiences with it.

Direct instruction. A student's first formal introduction to a thinking skill can be accomplished by using a simple five-step process. In this approach a teacher (1) introduces the skill to be taught by describing an example of it in action or by having the students actually do it. Then, referring to the introductory experience for examples, the teacher (2) explains the specific steps and rules for executing the skill and (3) demonstrates how the skill works with the content being studied. Next, working in triads or pairs under the teacher's guidance, the students (4) apply the skill procedures and rules to data similar to—but not the same as—that used in the demonstration. Finally, the students (5) restate and explain the basic components of the skill as they have used them so far. This fifth step is crucial in helping students take command of any skill.

After each beginning experience using a thinking skill, students should explain and discuss in some detail what they did. This procedure enables students to focus on the skill as the object of learning and helps them come closer to possessing the skill as their own.

Follow-up experience with a thinking skill is crucial if it is to be learned to mastery. Having been introduced to a skill as suggested above, students can later work in groups, pairs, or individually to use the skill on the content of their courses. Following each application of the skill—and after guidance from the teacher—students should then explicitly reflect on how and what they did in using the skill.

Thinking skills instruction should be direct and frequent; it should also be in small chunks and include immediate feedback. Little convincing data exists on how frequent such instruction ought to be; obviously there is a point of diminishing returns. Furthermore, frequency of instruction is conditioned by the abilities of the students, the learning environment, the complexity and nature of the content, and the skill being taught. But certainly in any year-long course, instructive practice in a single thinking skill might well be provided at least six to eight times in order to help students learn it to some degree of mastery.

Furthermore, skills instruction ought to be in segments of about 20 minutes with feedback provided immediately after practice. Feedback does not always have to come from the teacher, however. Research indicates that peer feedback benefits both the giver and the receiver.

Not every activity requires using the complete skill exactly as it is normally executed; learning activities can sometimes be analogous to the skill rather than equivalent to it. For example, instead of going through the basic procedures that constitute synthesizing data, students can identify or pick out examples of such synthetic statements from a number of statements of varying degrees of specificity. Answering or discussing questions such as the following serves as one type of such skill practice:

Which of the following sentences best includes all the others?
1. Captain Smith forced settlers to make fish nets and to plant corn.
2. He also ordered people to gather berries and to pick wild berries to eat.
3. John Smith ruled Jamestown colony with a firm hand.
4. Smith punished settlers who traded tools for Indian corn.

In this and similar activities, students can analyze and judge sentences to identify syntheses. The essential follow-up discussion of their choices can be as instructive as synthesizing their own generalizations from scratch—and less monotonous.
Teachers do not have to interrupt content lessons to teach thinking skills. Just as in teaching reading and writing skills, teaching a specific thinking skill can proceed, coincide with, or follow use of that skill. Before using a new skill students can engage in the five-step process outlined above and—in the last two steps—employ the skill with teacher guidance each time it is needed to complete the subject-matter task at hand. Teachers can also provide instruction while students actually use the skill by means of written skill guides that provide step-by-step directions on how to use the skill. And, after students have completed a skill-using task and have discussed their substantive findings, they can reflect on the procedures used in employing the skill. This final activity is as instructionally useful as demonstration before using the skill. Teachers who provide a number of skill teaching activities during and after “doing” a skill may well improve student learning of that skill.

There are other techniques for providing direct instruction in thinking skills. The important point, however, is that effective learning of thinking skills requires direct teaching. Without explicit direction on how to engage in a specific skill, students can flounder to the point of frustration and end up learning very little of the skill.

Integrated instruction. A third feature of effective thinking skills teaching involves integrating skill instruction with instruction in subject-matter and other skills. One thinking skill is not used in isolation from others nor in isolation from content. How we process information shapes what information we use and what we learn from it. And what we seek to learn shapes the thinking skills that we use to manipulate information.

Instruction in thinking skills can be integrated into any subject in at least two ways. The first is with subject-matter instruction. This is advisable, in part, because students are more motivated to learn a skill when instruction in that skill coincides with their need to use it to accomplish a goal related to the subject matter. Furthermore, most students regard subject matter learning as the main goal of instruction. Evidence also suggests that explicit teaching of cognitive skills in subject-matter courses improves the learning of that subject matter as well as the skills themselves.

A most propitious time to begin teaching the skill of detecting bias, for example, might well be in a social studies course when students are to learn more about the encounters between Europeans and Africans in the African interior in the 19th century. Guided analysis of European and African accounts of the same event can help students learn how to analyze data for bias in order to learn more about the overall subject. Teachers can thus maximize student learning of both content and specific thinking skills by teaching students how to use a given skill to accomplish specific content-related objectives. Similar opportunities for coupling skills instruction with content learning abound in all courses.

Instruction in thinking skills can also be integrated with instruction in other skills. Students can classify data in order to infer statements about a topic and then test these statements as hypotheses in reading assignments. They can, in effect, classify data (a thinking skill) to generate a purpose for reading (a reading comprehension skill). As the students prepare to classify such data, the teacher can provide the necessary instruction or guidance in how to execute the skill. Students can further use the inferences generated by the classifications as hypotheses to be tested in reading more of the text. They can also classify information to generate a topic sentence for a writing exercise and be taught how to classify at the same time. In a subsequent writing assignment, they can develop that topic sentence into a testable hypothesis. Skills instruction should be isolated neither from the study of subject matter nor from instruction in other skills.

Developmental instruction. As students move upward through the grades, they customarily deal with materials, content, and ideas that are increasingly complex, abstract, and sophisticated. The teaching of thinking skills should keep pace with this progression in order to help students develop the skills to deal with these increasingly sophisticated materials and tasks.

Instruction in thinking skills at one grade level should build on thinking skills introduced in previous grades and set up skills to be introduced in succeeding grades. Thus, for example, instruction in classifying ought to precede and set up later instruction in the skill of generalizing. Such teaching should also reinforce previously introduced skills by having students apply these skills in different settings with appropriate review and reflection.

For example, teachers can provide instruction in elementary grades in rather low-level skills such as simple comprehending, classifying, comparing, and contrasting. In later grades they can teach the more complex skills of making relationships; analyzing part-whole relationships; identifying bias, assumptions, and frame of reference; analyzing the logic of an argument, and even synthesizing and evaluating.

The developmental teaching of thinking skills refines or broadens skills as students use them over the years. Thus,
the skill of classification can be refined and extended in later courses as the skills of multiple classification and multi-variable classification; the skill of identifying frame of reference may be refined later as the skill of detecting bias.

Providing systematic, developmental instruction in thinking skills in sequences builds on the cognitive development of students. Depending on the kinds of data with which students use these skills, such teaching can also help move students from concrete operational thinking to more formal, abstract reasoning.

Waiting to provide formal instruction in certain skills until students are older does not mean younger students cannot engage in tasks that require simple versions of those skills. Youngsters in the primary grades commonly make judgments and separate relevant from irrelevant data. It is important, however, that in earlier grades teachers should not expect to provide formal instruction in the more complex skills, nor should they expect youngsters in the lower grades to learn all the procedures involved in particular thinking skills.

Learning a thinking skill is a task that is rarely “done.” Skill learning continues throughout life as individuals use skills in various contexts for various purposes. But once students leave school, formal instruction in thinking skills is quite likely to cease. It is very important, therefore, that direct, developmental instruction in these skills continue as long as possible so students can move away from teacher-directed learning to more and more self-direction.

Curriculum Guidelines for More Effective Thinking Skills Teaching

In addition to the teaching conditions and strategies that create more effective classroom instruction in thinking skills, certain curricular conditions are necessary. The following seem most significant.

1. The curriculum should focus on introducing only a few—perhaps three to five—new thinking skills per grade level and on providing repeated practice and reinforcement in these skills throughout that grade and in subsequent grades. At any single grade, teachers should also provide opportunities for students to receive guided practice in using and extending skills introduced in previous grades. To be most effective, any thinking skills program should concentrate on a few skills at a time and provide continuing instruction in each.

2. Curriculum guides and other materials should describe for teachers, in as much detail as possible, the essential components of each thinking skill to be taught. These guides should also suggest strategies for introducing and reinforcing each skill with appropriate subject matter at prescribed places throughout a course or sequence of courses. At the moment, most thinking skills taught are so ill-defined that what passes for these skills is quite idiosyncratic and rather inconsistent from one district (indeed from one classroom or teacher) to another.11 The way in which critical thinking is defined, or not defined, illustrates this confusion over skills. To some educators critical thinking is careful and exact evaluation and judgment. Others consider critical thinking to be subjecting a topic to severe criticism. Still others define critical thinking as thoughtful consideration about issues of great import, issues that imply considerable risk or danger. Finally, some teachers consider critical thinking to consist of a range of very specific analytical or evaluative skills such as identifying bias in a statement, judging the logic of an argument, or evaluating the accuracy of given factual claim. These definitions quite clearly imply different conceptions of this skill. It is thus not surprising to find that what is taught as critical thinking differs considerably from one classroom to the next, as well as from one subject area to another.

A detailed, readily available description of specific thinking skills can provide a common basis for instruction, continuity of instruction across grade levels, and more objective evaluation of skill learning. Moreover, such descriptions can help maintain the crucial distinctions between specific cognitive skills and the more comprehensive skill—using strategies of problem solving, decision making, and conceptualizing.12 Communicating clear, detailed descriptions of every thinking skill to be formally taught and tested in any program distinguishes top quality curricula from mediocre ones.

3. An effective skills curriculum also relates thinking skills to be taught in one content area to those taught in other areas. It is dysfunctional and a waste of time and resources for teachers in one subject area to teach skills in isolation from other subject areas that use the same and related skills. The components of the generic skill of analysis, for example, are essentially the same regardless of the subject matter in which this skill is employed.

In fact, an effective thinking skills curriculum should provide for a districtwide pattern of introducing, reinforcing, and extending these skills throughout all subject matter areas. While responsibility for providing initial instruction in any given skill may be clearly assigned to different subject areas at various grade levels, responsibility for reinforcing and extending it should be spread among other subject areas as appropriate.

One crucial feature of such a districtwide skills program must be a common instructional language. Until all teachers in a district apply the same terms to the same intellectual skills, students cannot successfully transfer the skills learned in one class, nor can teachers improve their teaching of these skills.

4. A thinking skills curriculum should also use a wide variety of media. The skill of comprehension, for example, can be taught with films, filmstrips, records, and oral reports as well as with written texts. Providing for instruction and reinforcement in any particular thinking skill using graphs, then maps, then narrative text, then a document, and then paintings, and so on can extend a student's competency in the skill and facilitate transfer as well as provide variety in the learning environment. Providing continuing instruction in a skill using a wide range of materials and media across a range of different subjects is an essential feature of developmental skills instruction. School curricula should make explicit provisions for this type of instruction.

Teaching Thinking Skills Across the Curriculum

The goal of teaching thinking skills is not simply to teach such skills to the exclusion of all else; it is to equip students with the thinking tools they need in order to learn. Knowledge and skills learning are closely related. Research suggests that systematic attention to skills instruction improves subject matter learning, just as learning of skills...
is enhanced when students receive instruction in a skill at the time that skill is needed to accomplish a subject matter-related goal. Teaching thinking skills and content is not an either-or proposition.

Admittedly, providing effective instruction in thinking skills in various subjects is no easy task. Much remains to be done to identify how best this can be accomplished. However, the ideas outlined here may well serve as useful guidelines to achieving this important goal.


See the summary by Barak Rosenshine in ASCD Update, June 1982, p. 3, as well as Block, op cit.


Landstrom, op. cit.; Estes, op. cit.