

To enhance thinking skills, we need to use tested models of teaching and make the strong investment in staff development that is required for any innovation to succeed.

Models for Teaching Thinking

BRUCE JOYCE



Old fencing masters used to tell their students that you grip the sword as you would hold a sparrow. If you hold it too tightly, it cannot breathe. If you hold it too loosely, it will fly away.

Good thinking bears analogy to the fencer's grip. It combines discipline with flexibility. If we are to nurture it, we must master that paradox and create environments that offer strength without strangulation. We must create a school where the study of human thought is a central mission, where the cultivation of the intellect is comfortably woven with the study of values, the mastery of information, and training in the basic subjects.

In this school, science and social science are taught with the methods of their parent disciplines. Reading, literary analysis, and writing draw on criticism and nurture productive thinking. Theatre introduces the craft and special metaphors of the stage. Domestic and international perspectives are illuminated by philosophy. The atmosphere draws talent into bloom as naturally and inexorably as springtime leads the daffodil toward its lovely fate.

Through the ages this dream has had different forms in the minds of our most powerful thinkers. As we enter a period when it is again gaining prominence, this time with an emphasis on the skills of thinking, we need to

ponder why something as universally affirmed has so rarely become a dream fulfilled in the realities of education.

I believe that two bad habits share the majority of the blame. (The enemy, as usual, is us.) The first is the habit of setting different approaches against each other and persuading ourselves that they are incompatible. The second habit is trying to reform the school without the emotional and material investment to really change it, especially investment in the education of its staff. By producing unnecessary argument and confusion, the first saps our strength. The second satisfies our nostalgic love of the old schoolhouse. By giving change a limp hand, we don't have to give up our old ways. Let's look at these habits in concrete terms.

Unnecessary Dichotomies

The most familiar wrangles are between the emphasis on basic school subjects, most commonly the "basic skills" and on the direct teaching of thinking. The argument is most often carried on as if to do one would sacrifice the other. Otherwise reasonable people argue that if we teach the sciences inductively, we will lose coverage of the subject, that we will undermine values if we teach students to think about them, or even that drill and practice will always and surely dull the mind. These arguments reductio ad absurdum, riding on deeply

Bruce Joyce is Professor, College of Education, University of Oregon, Eugene.

felt emotions and expressed in hyperbole, are hangers-on from the poverty of our past, when it seemed almost too much to afford the barest education. Now, when any but the fullest education will deprive our children of important parts of the achievements of this new worldwide civilization, we must put away the childish toy of dichotomous thinking. The skills of reading, the study of values, the analytic tools of scholars, and the nurture of intuition are compatible, and we can and should teach them together. As we enter this period of renewed emphasis on the teaching of thinking, let us not pit the cultivation of the new mind against the acquisition of skills and knowledge as if these goals were adversaries.

Our second bad habit, trying to make educational changes without the pain of sufficient investment, must also be overcome as we renew emphasis on the teaching of thinking. We need to profit from our recent history with academic reform, which, we must now acknowledge, received sufficient attention to staff development, leadership training, and materials in only a few districts. In those it was very successful. In others, the implementation levels were so low as to make the study of effects a hopeless activity (Fullan and Pomfret, 1977; Fullan and Park, 1981; Fullan, 1983; Joyce, Hersh, and McKibbin, 1983). This time around, however, we have the advantage of knowing these mistakes and more about the process of innovation.

We also have a rich storehouse of methods for teaching thinking that we can build on; we do not have to start from scratch.

On Not Doing Things Halfway

Carl Bereiter (1984) has analyzed a variety of approaches that districts use to implement the teaching of thinking. He has identified two that are unlikely to work and a third that will. The first is to teach thinking as "enrichment." The second is to teach thinking as subject matter.

When thinking is taught as enrichment, either special "thinking" exercises are developed and added to the curriculum, or special classes on thinking are organized. In either case thinking is seen as something that is "added on" as if it were a curriculum area. Being separate from academic substance, it is likely to have lower priority than the core school subjects and is likely to disappear gradually. Also, it may be shallow because it is separated from content. It ends up in the same category as reading skills taught separately from literature. The approach creates a false dichotomy between basic subjects and intellectual activity. Worse, it says that it is all right to teach the core subjects in a manner that does not stretch the intellect so long as we stimulate it elsewhere.

Then why would anyone take this approach? Because it can be implemented administratively without rocking the educational boat. If teachers learn some thinking games that they can employ or we set up special workshops for thinking, then the curriculum as a whole is not touched. The hard task of learning to teach everything in an intellectually stimulating manner can be avoided.

Teaching thinking as content is the second approach. To do it, one pro-

ceeds to identify the elements of "good thinking" and then teaches students what those elements are. Essentially, the result is a course in logic and problem solving. Now, raising thinking to a conscious level can be valuable. The problem is that the practice of thinking requires content if students are to transfer use of the knowledge outside the "thinking laboratory."

The Treatment of Choice— The Pervasive Approach

As Bereiter points out, there is a third alternative, a "pervasive" approach. It is possible to pervade the curriculum with intellectual process so that the teaching of thinking is an important component of every school activity. The reasons for doing so are several.

First, we have a substantial storehouse of models of teaching that directly teach both content and intellectual process (Joyce and Weil, 1980). While we always need to invent more, the existing storehouse is more than adequate to create programs that will develop many of the most powerful ways of thinking that have been promised.

Second, these models of teaching result in more effective teaching of the basic school subjects, both elementary and secondary, than the methods generally employed to teach them. In other words, we have a substantial number of teaching models that are reasonably well backed by research that indicates they teach thinking as well as increase the learning of subject matter and academic skills (Joyce, Showers, Beaton, and Dalton, 1984).

Third, teaching the basic subjects in such a way that thinking is enhanced avoids the traditional dichotomies between the content of education and intellectual activity. There is no inherent conflict between teaching the fundamentals of citizenship in a democratic society, learning to read, writing, analyzing literature, engaging in scientific inquiry, and participating in the performing arts or athletics, on the one hand, and learning to think on the other. All have some educational truth, and each is enhanced by the other. To teach the basic subjects without teaching thinking simultaneously not only neglects thinking, but is inefficient. Students learn more traditional substance when mastery is generated by models that also produce intellectual growth. Similarly, the development of citizenship is enhanced by the analysis of social values and the clarification of social issues. Learning to be a committed and self-aware person is enhanced by learning to think about one's growing self and to analyze one's development and social milieu.

Models of Teaching, Thinking Skills, and Curriculum

Various kinds of thinking are enhanced by particular models of teaching. There are models designed to teach students to:

- Attack problems inductively—concept formation models (Taba, 1966).
- Attain concepts and analyze their thinking strategies—concept attainment models.
- Analyze social issues and problems—jurisprudential and role playing models (Shaver, 1978; Shafiel, 1980).
- Think divergently—synectics and group investigation (Gordon, 1976; Thelen, 1961).
- Work together to generate and test hypotheses—group investigation and scientific inquiry (Thelen and Schwab, 1968).
- Reason causally—inquiry training, scientific inquiry, synectics, group investigation, simulation.
- Master complex bodies of information—memory models, scientific inquiry, group investigation.
- Analyze personal behavior, set personal goals, and conduct independent inquiry—nondirective teaching, awareness training.
- Analyze social situations and develop flexible social skills—role playing, assertiveness training, simulation,

group investigation, nondirective teaching.

• General intellectual complexity. Although all of these models contribute heavily to general growth in thinking ability, the cognitive development and conceptual models are specifically designed for cognitive growth (Sigel, 1969; Hunt, 1977).

This is just part of the storehouse and the types of intellectual growth that various models can stimulate. Some of them are designed to teach particular types of thinking, and others teach thinking skills that are applicable in many types of situations. For maximum effect, they are generally used in combination, which can lead to some very impressive results. Spaulding (1973) used a combination of social learning, scientific inquiry, and cognitive development models with disruptive primary school students from economically deprived homes with effects on social behavior, lower- and higher-order achievement, and even increases in general intelligence. Some single models, intensively used, have also been impressive. Well-implemented scientific inquiry models have achieved substantial informational and conceptual outcomes, successfully taught methods of scientific inquiry, and also produced increases in intelligence test scores (Bremer, 1984).

Models are combined not only to pyramid their effects but to address the different kinds of objectives and thinking that we wish to engender. For example, learning how to memorize is an important intellectual skill, but we would not expect a memory model to be the only foundation of creative thinking. Conversely, creative thinking models enhance memory, but they are not the only ones we would use.

Some Information from Using Models for Teaching Thinking with Children

All of the originators of these models of teaching have experimented with them intensively, and some models have been the subjects of literally hundreds of formal investigations. Information from clinical experience has particular relevance for those currently orienting their schools toward a greater emphasis on the teaching of thinking.

First of all, the core outcome of using a model of teaching is that students learn how to learn (reason) in a certain fashion. When we use a model to enhance memory, we teach stu-

“The skills of reading, the study of values, the analytic tools of scholars, and the nurture of intuition are compatible, and we can and should teach them together.”

dents to think in such a way that they increase their ability to memorize. Similarly, inductive models teach students how to learn inductively by thinking inductively. Group investigation teaches students to work together to gather information, set and test hypotheses, and balance one another's perspectives for approaching a problem area.

To teach students how to think and learn in a certain way, we have to establish a program that is used on a regular basis. If, in social studies, we wish to teach strategies for analyzing social issues, then we have to use the appropriate model over time and handle it so that students become increasingly able to analyze social issues independently. In other words, we teach the model to the students. This takes patience. The first time students are exposed to a method for attaining concepts, they are likely to be inefficient. With practice and instruction they become more competent. Finally, they are able to attain concepts and analyze their thinking strategies effectively and comfortably. Teachers and administrators often are concerned that students first exposed to a model appear slow and uncomfortable with its processes. They worry that valuable instructional time will be lost. If they persist, however, they will find that the students become more powerful. In the early stages we provide more structure and explicit instruction in the skills necessary to learn from and use a model. As the students become more skillful, less and less instruction is necessary from us (Joyce, 1984).

Third, by teaching students how to reason independently, we increase their power to teach themselves and must share power in the instructional situation. We can't teach students to reason inductively and then reject the ideas they develop. We can guide them so that they develop better and better ideas. Encouraged to think creatively, students will develop solutions we have not thought of. We have to expect this and learn to love the uncertainty it creates for us.

Fourth, strategies for thinking do not come in fragments. We can't teach their elements as isolated skills, such as "how to observe objectively." Rather, we teach thinking strategies that include particular skills, such as how to observe, but the observations are used in relation to other skills.

Thus, the teaching of thinking requires a commitment to solid instruction in the models of teaching that engender those types of thinking and the willingness to persist until students become effective in their use. Thinking strategies are most effectively taught in conjunction with appropriate content. It is not difficult to use synectics to teach students to use metaphors and analogies more skillfully in their writing unless we try to teach the use of metaphor separately from the acts of writing. It is not difficult to teach students to form concepts when they read unless we separate concept formation from the act of reading.

Thus, teaching thinking requires that we teach the core subjects differently. Therein lies our biggest problem.

Learning to Teach Thinking

The difficulty arises from the fact that models for teaching thinking are considerably different from the norms of instruction in most school settings. Studies of teaching and staff development reveal what any observer can easily discover: the recitation method dominates most schools and is the major item in most of our repertoires (Medley, 1981). Why is that a problem? Simply because it means that most of our students and most of us have much more practice with recitation than with other methods of teaching. This is another way of saying that we wouldn't have to worry about teaching thinking if we had been doing it all along. The students would be good at the appropriate models, and we would be good at teaching students to use them.

"Thinking strategies are most effectively taught in conjunction with appropriate content."

Also, the public as well as students have become accustomed to the comfortable old recitation and have been persuaded that it is much more efficient than it is. They would like thinking to be taught, "just as long as it doesn't jeopardize the real stuff."

Finally, we have learned that to master unaccustomed models of teaching, we teachers have to study their theory, see them demonstrated, practice them, and even then will have to use them in classrooms and learning laboratories many times before we become fully comfortable with them. Much more practice is needed before we can comfortably and strongly teach children the thinking strategies that underlie them (Joyce and Showers, 1984).

The message is that very strong staff development programs are needed if we are to develop the skills that enable us to teach students these kinds of thinking skills. About ten days of training are necessary to reach the initial stages of mastery of a complex model of teaching, and then it has to be practiced a dozen or more times before it becomes part of the natural repertoire. Each of us has to master four or five of those models before we can effectively teach thinking in a course within any given curriculum area. Thus, a district that wishes to build a strong program has to invest in substantial opportunities for staff members to learn them (Joyce and Showers, 1984). We have passed the time when we can adopt an important curricular or instructional change without the investment in human resources to make it come to life. □

References

- Bereiter, Carl. "How to Keep Thinking Skills From Going the Way of All Frills." *Educational Leadership* 42 (September 1984): 75-77.
- Brederman, Thomas. *Elementary School Process Curricula: A Meta-Analysis* (ERIC ED170333).
- Downey, Lawrence. *The Secondary Phase of Education*. Waltham, Mass.: Blaisdell, 1966.
- Fullan, Michael. *The Meaning of Educational Change*. New York: Teachers College Press, 1982.
- Fullan, Michael, and Park, Paul. *Curriculum Implementation: A Resource Guide*. Ontario: Ontario Ministry of Education, 1980.
- Fullan, Michael, and Pomfret, Allen. "Research on Curriculum and Instruction Implementation." *Review of Educational Research* 47 (1977): 335-397.
- Hunt, Donald C. "A Conceptual Level Matching Model for Coordinating Learner Characteristics with Educational Approaches." *Interchange* 1 (June 1970): 1-31.
- Joyce, Bruce, and Weil, Marsha. *Models of Teaching*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1980.
- Joyce, Bruce, Hersh, Richard, and McKibbin, Michael. *The Structure of School Improvement*. New York: Longman, 1983.
- Joyce, Bruce, and Showers, Beverly. *Power in Staff Development*. Alexandria, Va.: Association for Supervision and Curriculum Development, 1984.
- Joyce, Bruce, Showers, Beverly, Beaton, Colin, and Dalton, Michael. "Teaching Skills Derived from Naturalistic and Theory-Driven Lines of Inquiry." Paper presented to the annual meeting of the American Educational Research Association, New Orleans, 1984.
- Medley, Donald. *Teacher Competency and Teacher Effectiveness*. Washington, D.C.: American Association of Colleges for Teacher Education, 1977.
- Oliver, Donald, and Shaver, James. *Teaching Public Issues in the High School*. Logan, Utah: Utah State University Press, 1974.
- Schwab, Joseph J. *Biology Teachers' Handbook*. New York: Wiley, 1965.
- Shafiel, Fannie, and Shafiel, George. *Role Playing for Social Values*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1967.
- Sigel, Irving. "The Piagetian System and the World of Education." In *Studies in Cognitive Development*. Edited by David Elking and John Flavell. New York: Oxford University Press, 1969.
- Spaulding, Robert L. *Educational Intervention in Early Childhood*. Durham, N.C.: Duke University, 1970.
- Taba, Hilda. *Teacher's Handbook for Elementary Social Studies*. Reading, Mass.: Addison-Wesley, 1967.
- Thelen, Herbert. *Education and the Human Quest*. New York: Harper's, 1960.

Copyright © 1985 by the Association for Supervision and Curriculum Development. All rights reserved.