ROBERT J. MARZANO, DEBRA J. PICKERING, AND RONALD S. BRANDT

Integrating Instructional Programs Through Dimensions of Learning

The "Dimensions" framework—based on general principles of how learning occurs—can be used to plan instruction, coordinate the use of various programs, and select and plan staff development activities.

Today's teachers have available an abundance of practices that can help them do a better job. Developers have designed and tested programs for maintaining discipline, motivating students, applying learning theory, encouraging cooperative behavior, teaching thinking skills, and so on. Unfortunately, many of these programs are seen as independent of one another, so they become bandwagons, each an isolated movement that lasts until the next one comes along. A teacher tries a little mastery learning for a while, then teacher expectations, then cooperative learning, then teaching thinking, and so on.

What is needed is a framework to integrate these programs: a tool that will help educators see how the various practices relate to one another. With such a framework, teachers will find it easier to blend several different programs, and administrators will be able to select and present various staff development efforts as a unified whole rather than as separate entities.

As we have worked with classroom teachers over the last two years to implement ASCD's *Dimensions of Thinking* (Marzano et al. 1988), we have begun to see how the types of thinking discussed in that publication can be recast into such a framework.

Use of the framework will help teachers blend several different programs and administrators select and present various staff development efforts as a unified whole rather than as separate entities.

A Common Thread: Teacher Behavior

A thread running through most staff development programs is that teachers' actions are expected to produce certain types of thinking in students. If a teacher increases her physical proximity to a student who is misbehaving, the student may realize that he is breaking a classroom rule and correct his behavior; when a teacher asks a recall question, it cues students to search their memories for the requested piece of information.

This suggests that if we can identify the main types of student cognitions needed for various learning tasks, we can use the resulting scheme to classify the instructional practices featured in the leading inservice programs.

Some Principles of Learning

Unfortunately, student thinking doesn't occur in neat, easily identifiable categories. To guide our effort, therefore, we have identified four principles of human learning gleaned from current research and theory.

Principle #1: Attitudes and Perceptions Affect Learning

Recent research in motivation (e.g., Harter 1982; McCombs 1986; Weiner 1972, 1983) indicates that a person almost always approaches a task with a set of accompanying attitudes and perceptions that greatly influence performance. When a student sits down to read a chapter in a text for a course she is studying, she approaches the reading task with certain attitudes about the value of the course, the value of the textbook, and her knowledge and ability relative to the content being studied. Some attitudes are conducive to learning; others work against it. If the student believes that the course is quite valuable because it will help her attain a personal goal, her attitude will positively affect her learning. Conversely, if she can't see the value of the course, her attitude will negatively affect her learning.

Principle #2: Learning Involves Acquisition of Two Kinds of Information

Knowledge can be divided into two basic types: declarative and procedural (Paris and Lindauer 1982, Paris et al. 1983). *Declarative knowledge* is concerned with who, what, where, and when; for example, information about who was involved in Watergate, what occurred, and where and when it occurred. Researchers commonly subdivide declarative knowledge into (in order of specificity) facts, time sequences, causal networks, problems/solutions, episodes, principles, and concepts.

Procedural knowledge is knowledge of "how to," such as how to write a research paper. Sometimes the components of procedural knowledge are represented as steps that must be applied in a particular sequence; for example, the algorithm for doing long division. Others are much more loosely ordered, for example, the procedure for reading a bar graph.

Content in any field can be subdivided into these two major types. A course in geography might include concepts and principles (declarative knowledge) about the distribution of land, along with processes (procedural knowledge) such as how to read a contour map.

The dimensions are most useful as a kind of metaphor to guide instruction.

Principle #3: Once Acquired, Knowledge Undergoes Changes

Much recent research sheds light on the specific cognitive operations involved in the initial acquisition of information (for a review, see Anderson 1983, Estes 1982). A key cognitive operation is *activating old knowledge* and using it to make sense of new information. For example, while watching a documentary on sharks, you use your previous knowledge about sharks to help you make sense of the new information.

Another cognitive operation used when initially learning new information is *organizing the information* in such a way as to associate it and make linkages with existing knowledge in long-term memory. This not only helps your understanding of the new information, but it also makes the information more retrievable for use at a later date.

But knowledge stored in the mind is not static. Over time it changes, sometimes quite unexpectedly. Rumelhart and Norman (1981) have identified three types of knowledge change: accretion, tuning, and restructuring. *Accretion* refers to changes in knowledge due to the gradual accumulation of information. *Tuning* refers to the creation of generalizations about existing information. (It is a much more global and radical form of change than accretion.) *Restructuring* is the most global and most radical form of change, involving the creation of entirely new structures either to augment or to replace the old structures.

Common to all theories of knowledge change is the idea that to change an existing knowledge structure, the learner must mentally process the information in new and unusual ways (for a review, see Vosniadou and Brewer 1987). For example, when a student compares two or more concepts in detail, even if he knows them fairly well, he will probably "learn" something new.

Perhaps the most change-producing cognitive function is the *actual use of knowledge* in meaningful ways. It is one thing to listen to or read instructions for how to use a computer word-processing program but another thing entirely to actually use the program to prepare a manuscript. Only through actual use do most people begin to understand how the system works, as they solve the frustrating problems they invariably encounter.

In summary, the continuum of knowledge development involves cognitive operations that the learner uses to *acquire* information, other operations that the learner uses to *refine* the information, and still other operations that the learner can employ to *make use of* the information in meaningful ways.

Principle #4: Effective Learners Exhibit Dispositions Associated with Critical, Creative, and Self-Regulated Thinking

Based in part on studies of capable thinkers, scholars have identified various qualities of desirable thinking, often referred to as critical and creative thinking. Perkins (1984), Ennis (1985), Glatthorn and Baron (1985), Lipman (1988), and Costa (1985), for example, cite numerous characteristics of "good" thinking, including:

- being aware of one's own thinking at any point in time,
- seeking accuracy in what one does,
- operating at the edge rather than the center of one's ability.

Operations such as these are sometimes referred to as *dispositions*, because a person who has formed desirable habits of mind is "disposed" to behave in these ways. Dispositions are

not unconscious; good thinkers often strive quite deliberately to meet such standards, asking themselves, "Have I considered other points of view fairly?" "Have I examined enough alternatives?" These habits of mind, while not innate, can be internalized with practice and thus can become part of one's personality.

Principles of Learning into Dimensions of Learning

The four principles of learning can be used to identify types of student thought that need to occur for learning to take place. We might call them "Dimensions of Learning": types of cognition that facilitate learning. Our portrayal of these dimensions will imply a general pattern or sequence (first one type of thinking occurs, then another), but that should not be taken literally; the dimensions are most useful as a kind of metaphor to guide instruction. As we will demonstrate, they can also be used to help understand how various instructional programs are similar and different.

The five dimensions that spring from the principles of learning are: (1) thinking needed to develop positive attitudes toward learning, (2) thinking needed to initially acquire and integrate knowledge, (3) thinking needed to extend and refine knowledge, (4) thinking needed to make meaningful use of knowledge, and (5) thinking needed to develop desirable habits of mind. Although not a direct translation, these five dimensions are adapted from the ASCD-sponsored framework, *Dimensions of Thinking* (Marzano et al. 1988). Here is a brief explanation of each dimension.

Dimension 1: Thinking Needed to Develop a Positive Attitude Toward Learning

As summarized in the first principle of learning, an important factor in any instructional situation is the student's attitude. We have identified three categories of attitudes and perceptions especially relevant to learning: attitudes and perceptions about (1) self and climate, (2) self and others, and (3) self and the task.

Attitudes about self and climate include the learner's perceptions about safety, comfort, and order in the learning situation. One of the learner's first concerns is often his or her own safety and comfort. This point has been emphasized by learning theorists such as Maslow (1968) and Combs (1982), and reinforced by findings of the school climate studies of the 1970s (Denham and Lieberman 1980).

Another category of attitudes affecting learning is *attitudes about self and others*. Student tend not to learn well unless they feel accepted by the teacher and the other students. The research on teacher expectations (Good 1982, Good and Brophy 1972) has shown the importance of student perceptions of teacher acceptance, and research on cooperative learning (Johnson et al. 1984) has shown the importance of student perceptions of acceptance by their peers.

The final area of attitudes affecting learning has to do with *self and task*. The learner must believe that the task has value, that she has a fairly clear understanding of what is required, and that she has the ability to complete it; otherwise the task becomes a threat to her sense of competence (Covington 1983).

To provide for this dimension, teachers need to be able to establish and maintain an appropriate environment for learning. For example, a teacher might reinforce effective attitudes about self and climate by occasionally greeting students at the door or by arranging the physical aspects of the classroom in such a way as to accommodate different learning styles. A teacher might reinforce effective attitudes about self and others by making sure he provides equal opportunities for students to answer questions (so that students have a sense of acceptance by the teacher) and by using cooperative learning (so that students develop a sense of community and peer support). A teacher might establish effective attitudes about self and task by structuring tasks for high success, using scaffolding with students who are having difficulty, and communicating to students a sense of confidence in their ability to accomplish classroom tasks.

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Dimension 2: Thinking Needed to Acquire and Integrate Knowledge

The second principle of learning discussed earlier makes a distinction between two kinds of knowledge important to any content area: declarative and procedural. The third principle of learning indicates that a learner changes knowledge over time rather than simply retaining it in the form in which it was first acquired. Putting these two principles together, the second dimension of learning deals with the acquisition and integration of both declarative and procedural knowledge. The mental processes involved in this second dimension can be subdivided into three types: (1) constructing meaning, (2) organizing content, and (3) storing or practicing.

Acquiring Declarative Knowledge

Constructing meaning refers to using

what is already known to make sense of what is to be learned. Research, particularly research in reading comprehension, has established numerous strategies that can be used to help students construct declarative knowledge. For example, in K-W-L (Ogle 1986) the learner begins by identifying what she knows about the topic (K = what I already *know*), and what she would like to know (W = what I *want* to know). She then reads (listens to, observes) the information and determines what she has learned (L = what I *learned*). The strategy involves the learner in actively constructing meaning for new information.

Organizing declarative knowledge involves making distinctions among the different types of important information taught in a lesson (e.g., facts, time sequences, causal networks, problem/solutions, episodes, concepts, principles). Making these distinctions is the key to effective learning of declarative information. Specifically, since much of the declarative information presented to students orally and in writing can be organized in a variety of ways, students need to be able to organize the content in a way consistent with the teacher's preferred method of organization. If a teacher does not explain his preferred method of organization before presenting information, the instruction will lack focus and will impose on the learner the burden of trying to figure out how to organize it.

Finally, *storing information* involves representing it in long-term memory in a way that makes it easily accessible at later times. Operationally, this involves use of techniques such as verbal rehearsal, imagery, mnemonics, and so on.

Acquiring Procedural Knowledge

Two of the processes needed to acquire procedural knowledge are similar to those involved in acquiring declarative knowledge. For example, when first learning how to read a particular type of graph, a learner might help construct meaning by activating what she knows about reading other types of charts or graphs, thus creating an initial model of the process involved. Operationally this might involve making a flowchart showing steps in the procedure.

Storage, however, is different for the two types of knowledge. Whereas declarative knowledge needs to be stored for easy retrieval, procedural knowledge must be practiced to the level of automaticity. Operationally, this means that the learner needs to practice the procedure long enough that he can perform it with relatively little effort or thought.

The second dimension of learning, then, is thinking that helps the learner initially acquire and integrate both declarative and procedural information. Cognitively, this requires the construction of meaning, the organization of information, and either storage or practice, depending on whether the information is declarative or procedural.

Dimension 3: Thinking Needed to Extend and Refine Knowledge

According to the third principle of learning, knowledge continues to undergo substantive change after it has been acquired. One might say that once it has been acquired, knowledge is then available for extension and refinement, which comes about through processing the information in new and unusual ways. We have identified eight such ways (fig. 1).

Each of the cognitive operations listed in Figure 1 can be used to engage the learner in such a way as to change his or her knowledge of the content. In a social studies class, for example, students might compare different forms of government (democracy and dictatorship) to discover new distinctions between them. Similarly, making deductions, such as anticipating future events or conditions based on current information, can help students better understand the information on which the deductions are made. In a science class, for example, students might make deductions about whales based on known principles about mammals to refine and extend their knowledge about mammals and whales.

We might point out that the cognitive operations listed in Figure 1 may also be used when initially acquiring knowledge. For example, when first learning about types of governments, students may engage to some degree in comparison, induction, deduction, and so on. At this stage, however, most such activity will be automatic and relatively unconscious. To extend and refine knowledge, these operations are used consciously, rigorously, and with greater complexity. For example, when students first learn about democracies and republics, they might think casually about similarities and differences be-

Fig. 1. Extending and Refining Operations

Comparing:	Identifying and articulating similarities and differences between bodies of information relative to their specific attributes.
Classifying:	Grouping items into definable categories on the basis of their attributes.
Inducing:	Inferring unknown generalizations or principles from observation or analysis.
Deducing:	Inferring unknown consequences and necessary conditions from given principles and generalizations.
Analyzing Errors:	Identifying and articulating errors in one's own thinking or in that of others.
Constructing Support:	Constructing a system of support or proof for an assertion.
Abstracting:	Identifying and articulating the underlying theme or general pattern of information.
Analyzing Value:	Identifying and articulating personal value and general value of information.

Fig. 2. Processes Involving the Meaningful Use of Knowledge

Oral Discourse:	The act of discussing a topic using specified conventions that add clarity to and provide new insights into the topic of discussion.
Composing:	The act of creating a new product using known information.
Problem Solving:	The act of attaining a content-related goal by overcoming some obstacle.
Decision Making:	The act of selecting among seemingly equal alternatives.
Scientific Inquiry:	The act of identifying underlying principles relative to a physical or psychological phenomenon, making predictions based on those principles, and then systematically testing the accuracy of those predictions.

tween the two. To extend and refine these concepts, however, they would be asked to list these similarities and differences, perhaps using some type of graphic or matrix representation. The difference is a matter of degree, focus, and conscious use.

Dimension 4: Thinking Needed to Make Meaningful Use of Knowledge

Our ultimate purpose for teaching the various forms of knowledge is to prepare our students to be able to use that knowledge in meaningful ways. As we know, one of the best ways to ensure that students fully understand the knowledge is to arrange for them to *make use of it at the time they are learning it*. Because something is meaningful to a person only if it fits with his or her goals, effective teaching involves finding ways for students to relate school knowledge to their personal goals.

We might note that the extending and refining operations listed in Figure 1 are not commonly the focus of personal goals. People don't often compare just for the purpose of comparing; they don't abstract simply for the purpose of abstracting.

Some cognitive operations, though, are more goal-directed. These operations, which we assign to Dimension 4, are briefly described in Figure 2.

For example, we call the process for creating something new *composing*. *Problem solving* is a process used to change an unacceptable situation, *decision making* is used to select among alternatives, and *oral discourse* is used to clarify information.

The process of understanding physical and psychological phenomena and then using that understanding to make predictions about future phenomena is *scientific inquiry*. In school, a student might engage in scientific inquiry to try to understand readers' reactions to certain types of language in a piece of writing. The student could then use that knowledge to predict how various types of readers might react to other texts.

Because these processes are so clearly goal-oriented, teachers can improve student motivation by organizing instruction around them whenever feasible. For example, in a history class, students might compose essays describing the events that led up to the Cuban missile crisis. They might use decision making to analyze Kennedy's reasons for blockading the Soviet missile-bearing ships. Or they might engage in oral discourse to clarify some of the issues around the events leading up to the blockade.

To summarize, the classroom tasks that perhaps have the most potential for changing existing knowledge, especially when they are selected by students, are those that embody the processes listed in Figure 2.

Dimension 5: Thinking Needed to Develop Desirable Habits of Mind

The fourth principle of learning discussed earlier holds that good thinkers have certain "dispositions." These "habits of mind" include:

- being clear and seeking clarity,
- being accurate and seeking accuracy,
- being open-minded,
- taking a position and defending it,
- being sensitive to the level of knowledge and feelings of others,
- avoiding impulsivity.

Ennis (1985) has declared that these and similar behaviors are at the core of critical thinking. To illustrate, the learner might notice that she has a tendency to make bold assertions concerning topics she knows very little about and decide to begin trying to search her mind for evidence before she speaks. Another person might consciously strive to communicate in a clear fashion, checking to see whether others have understood his communication.

Another category of such characteristics is associated with creativity. Amabile (1983) and Perkins (1984) report that these include:

- engaging intensely in tasks even when answers or solutions are not apparent;
- pushing the limits of one's knowledge and abilities;
- generating and following one's own standards of evaluation;
- generating new ways of viewing situations outside the boundaries of standard conventions.

To illustrate, the learner might notice that she tends to "coast" through projects, expending as little energy as possible. To correct this tendency, she might "push" herself on a project, trying to do the very best she can.

The third category of desirable habits of mind are those that characterize self-regulated behavior. From research and theory in metacognition and self-efficacy (Brown 1978, Flavell 1976), we know that people can learn to:

- plan,
- be sensitive to feedback,
- use available resources,
- be aware of their own thinking,
- evaluate the effectiveness of their own thinking.

To illustrate, the learner might make a specific plan of action for an upcoming classroom project. As he implements his plan, he might occasionally note if he is getting closer to or further away from his goal and then make corrections as needed.

One of the biggest challenges teachers face is how to help their students develop the habits of mind associated with critical and creative thinking. Human history leads us to believe that young people develop these qualities by interacting with adults who model such behaviors and by consciously practicing them.

For example, a teacher might lead a discussion on a topic such as why the Supreme Court would uphold a person's right to burn the U.S. flag. Before the discussion, the teacher might remind students of the kinds of behaviors that help make for productive

Fig. 3. Comparison of Selected Programs on the Dimensions of Learning

Program*	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
Dimension #1: Attitudes																				
1. Self and Climate	S	S	S	S	M	–	–	–	–	–	–	–	–	–	–	–	–	M	S	–
2. Self and Others	M	S	S	M	M	–	–	–	–	–	M	M	–	M	–	–	–	M	S	M
3. Self and Task	S	S	M	S	M	S	S	S	S	M	–	–	–	–	–	–	S	S	S	–
Dimension #2: Acquiring and Integrating Knowledge																				
1. Declarative																				
a. Constructing Meaning	S	M	S	S	S	S	S	S	S	M	–	–	–	–	–	S	M	S	S	M
b. Organizing	S	M	S	S	S	S	S	S	S	M	–	–	–	–	–	S	S	S	M	S
c. Storing	S	–	M	M	S	S	S	S	S	M	–	–	–	–	–	M	S	S	S	S
2. Procedural																				
a. Constructing Meaning	S	M	S	S	M	S	S	S	S	M	–	–	–	–	–	–	–	M	S	–
b. Organizing	S	M	S	S	M	S	S	S	S	M	–	–	–	–	–	S	M	S	M	M
c. Practicing	S	–	M	S	–	S	S	S	S	M	–	–	–	–	–	M	S	S	S	M
Dimension #3: Extending and Refining Knowledge																				
1. Comparing	–	–	–	–	S	–	–	M	S	S	M	M	S	S	M	M	M	M	S	S
2. Classifying	–	–	–	–	S	–	–	M	S	S	M	M	S	S	M	S	M	M	M	S
3. Inducing	–	–	–	–	M	M	M	M	M	S	M	M	S	S	M	M	M	M	S	M
4. Deducing	–	–	–	–	–	–	–	–	–	M	–	–	S	S	–	–	–	–	–	–
5. Analyzing Errors	–	–	–	–	S	–	–	–	–	S	M	M	S	S	M	–	S	–	–	–
6. Supporting	–	–	–	–	S	M	M	–	M	S	M	M	S	S	M	M	M	M	–	S
7. Abstracting	–	–	–	–	–	–	–	–	M	M	M	M	S	S	M	S	S	M	S	M
8. Analyzing Value	–	–	–	–	–	–	–	–	–	M	–	–	S	S	S	–	S	–	–	S
Dimension #4: Meaningful Use of Knowledge																				
1. Oral Discourse	–	–	–	–	S	–	–	–	–	–	M	–	S	S	–	–	–	–	–	–
2. Composing	–	–	–	–	–	–	–	–	M	M	M	M	–	–	–	–	M	–	–	–
3. Problem Solving	–	–	–	–	S	–	–	–	S	M	S	S	S	M	S	–	S	–	–	S
4. Decision Making	–	–	–	–	S	–	–	–	–	M	M	S	S	M	S	–	S	–	–	S
5. Scientific Inquiry	–	–	–	–	S	–	–	–	–	M	S	–	–	–	–	–	M	–	–	–
Dimension #5: Habits of the Mind																				
1. Critical	–	M	S	–	M	–	M	–	M	–	S	S	M	S	S	–	–	–	–	M
2. Creative	–	–	M	–	M	–	–	–	–	–	S	S	M	S	–	–	–	–	M	S
3. Self-Regulation	M	–	S	M	M	–	M	M	S	–	S	S	–	M	–	–	S	–	M	–

Key:
S = strong emphasis
M = moderate emphasis
– = relatively little emphasis

**Program Key:*

A ITIP. Hunter 1969, 1976, 1982.
B TESA. Kerman, Kimball, and Martin 1980
C Cooperative Learning. Johnson and Johnson 1987; Slavin 1983, 1986.
D Mastery Learning. Bloom 1971; Block 1971, 1985; Guskey 1985.
E Models of Teaching. Joyce and Weil 1986.
F Explicit Teaching. Rosenshine 1986.
G Active Mathematics Teaching. Good, Grouws and Ebmeier 1983.
H BTES. Romberg 1980.
I Strategic Teaching. Jones, Palincsar, Ogle and Carr 1987.
J Bloom's Taxonomy: Cognitive Domain. Bloom, et al 1956.
K Olympics of the Mind. Gourley 1981.
L Future Problem Solving. Crabbe 1982.
M Project Impact. Winocur 1985.
N Philosophy for Children. Lipman, Sharp and Oscanyan 1980.
O CoRT. de Bono 1983, 1985.
P Strategic Reasoning. Upton 1961, Upton and Samson 1963.
Q Tactics for Thinking. Marzano and Arredondo 1986.
R The Skillful Teacher. Saphier and Gower 1986.
S 4MAT. McCarthy 1980.
T Teaching Styles and Strategies. Hanson, Silver and Strong 1986.

discussion. As the students expressed a variety of views on the issue, the teacher would ask for evidence, inquire about the premises underlying students' positions, and call attention to inconsistencies or irrelevancies. He might also reinforce desirable behaviors by judicious recognition and praise.

The final dimension of learning, then, is thinking characteristic of critical, creative, and self-regulated people. Like positive attitudes toward learning (Dimension 1), these qualities must be fostered in an indirect but conscious way. Whenever feasible, the teacher should overtly encourage self-regulated, critical, and creative thought.

The thinking we categorize as Dimension 5 is essential to effective performance of the kinds of thinking described in the other dimensions. For example, to make sound decisions, a person needs to exhibit objectivity and attention to evidence; to solve problems well, a person needs to produce imaginative solutions through habits of mind such as persistence and commitment to high standards.

In summary, the five dimensions represent the types of thinking that facilitate effective learning. They can be used to plan instruction that will improve students' success in mastering school content while also developing their cognitive skills.

Using the Dimensions as an Analytical Tool

The dimensions framework can also

be used to analyze and compare staff development programs and instructional practices. Specifically, one can determine which dimensions are emphasized in each program. Figure 3 is an analysis of 20 different programs from the vantage point of the five dimensions of learning.

In the figure, an *S* in any cell indicates *strong* emphasis on that dimension, an *M* indicates *moderate* emphasis, and a – indicates that the program puts relatively little emphasis on that dimension. This is not to say that the program or practice totally ignores that area (although it might), but only that in our judgment the program or practice does not overtly deal with that dimension. For example, Figure 3 indicates that the ITIP program (Column A) is strong in the "self and climate" and "self and task" components of Dimension 1 and moderate in the "self and other" component of that dimension. It is strong in all aspects of Dimension 2. However, even though some interpretations of the ITIP program use Bloom's (et al. 1956) taxonomy, which is strong in Dimension 3 (see Column J in fig. 3), the ITIP program per se does not directly address Dimensions 3, 4, and 5, except that it is moderately geared toward enhancing some of the habits of self-regulation in Dimension 5.

In addition to being used as a tool for analyzing various programs, the dimensions can be used as a vehicle for coordinating the use of programs. Specifically, it would seem highly advisable that a school or district select programs in such a way that they cover as many dimensions (with all of their subcomponents) as possible.

The Dimensions in Practice

This article has described the dimensions as a theoretical framework that can be used for instructional planning and program coordination, but it is also a working model that has been field-tested in a number of situations. Specifically, two of the authors (Pickering and Davis) have field-tested the framework as an instructional model in an elementary school for a year. Use of the model appears to increase students' knowledge of content as well as their ability to use the array of cognitive operations needed to learn academic content. Their field-testing also disclosed that the teachers attended to Dimensions 1 and 2 in their instructional planning and implementation but infrequently addressed Dimensions 3, 4, and 5.

The five dimensions can be used to plan instruction that will improve students' success in mastering school content while also developing their cognitive skills.

In addition to the field-testing that has already been done, ASCD has established a research and development consortium, which began in October 1989 and will end in August 1991, to test the effectiveness of about 200 strategies that have been incorporated in the model. Some 18 agencies, including 16 school districts from across the country, are participating in the consortium. ASCD also offers training in the Dimensions model as part of their National Training Center program each summer.

A Comprehensive Model for Teacher Education

The Dimensions model, which identifies five general types of thinking needed for effective learning, could eventually become the basis for a coordinated "curriculum" of preservice and inservice teacher education. At this point the model can be used to identify the cognitive focus of a number of existing staff development programs. Such an analysis allows educators to determine how these programs can be used in concert to promote student learning.□

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Robert J. Marzano is Director of Research, Mid-Continent Regional Educational Laboratory, 12500 E. Iliff Ave., Suite 201, Aurora, CO 80014. **Debra J. Pickering** is Staff Development Specialist in the Cherry Creek Public Schools, 7855 S. Willow Way, Englewood, CO 80112. **Ronald S. Brandt** is ASCD's Executive Editor.

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