function of schools can largely be eliminated through the teaching of thinking skills; that the resulting changes in curriculum and instruction will find virtually all students assuming responsibility for their own learning; and that increased effectiveness and efficiency in learning will become obvious throughout school systems.

Given these similar and highly optimistic beliefs and assumptions about student learning, the Mason Elementary administrators and teachers quoted in our opening scenario would probably be interested in putting thinking skills and mastery learning strategies together within their instructional program. Such integration would enable the school to meet community demands for better learning outcomes and at the same time respond to the growing pressures to serve an increasingly diverse student population. In short, it would allow staff to pursue both excellence and equity in learning, not to sacrifice one for the other.

And, indeed, when well implemented separately, both mastery learning and thinking skills programs appear to improve student learning. Despite contentions to the contrary (Slavin 1987, Brandt 1988a), mastery approaches almost always produce greater student achievement when compared to nonmastery ones regardless of the subject, grade level, or instructional period. For example, a 50th percentile achiever in a nonmastery class can reasonably be expected to move to somewhere between the 65th and 85th percentile, and most likely to the 77th, in a comparable mastery class (Block et al. 1989). Similarly, some fairly persuasive evidence exists to document improvements among less able, average, and more able students (Nickerson et al. 1985) when teachers focus instruction on student thinking. In fact, today's educators seldom question that they ought to be teaching thinking; for example, 84 percent of 1,144 teachers polled by the National Center for Education said that teaching reasoning and analytical skills was the most important goal of education (Stacy 1986).

A more important question is whether thinking skills and mastery learning models can be integrated during implementation, and, if so, what the impact will be on student learning. Bloom (1988), Soled (1986),

Integrating Thinking Skills and Mastery Learning in Baltimore County

Joan D. Kozlovsky

In 1980, Baltimore County Public Schools implemented mastery learning as part of a statewide school improvement model introduced by the Maryland State Department (Kozlovsky 1986, Roberts and Kenney 1986, and Roberts et al. 1986). Three 3rd and 4th grade teachers at Oakleigh Elementary School received intensive training in how to administer mastery learning in mathematics. During the 1981–82 school year, these teachers' students showed gains of seven months to one year on norm-referenced mathematics tests, three months more than their normative peers.

Because of attention gained from this achievement, school staff subsequently acquired block grant funding to continue the project. As a result, mastery learning expanded from one school and three teachers to more than 50 schools and hundreds of elementary teachers in various disciplines. The staff development model included those components shown to be effective in bringing about change (Joyce and Showers 1983).

Then, in September 1984, the coordinator of the mastery learning project decided to launch a thinking skills project. Staff at five volunteer schools received training in improving student thinking. As the two projects developed, it became clear to us that the basic premise of the mastery learning paradigm—that given time and appropriate instruction, all students will learn well—was similar to the underlying assumption of the thinking skills movement—that students can learn to think better if schools teach processes for thinking. It became equally clear that these two projects shared the objective of giving teachers the means, and the opportunity, to teach both content knowledge and thinking processes.

Recognizing this overlap, we began to include thinking skill strategies throughout all phases of the mastery model. As the staff introduced the thinking strategies, we flagged inclusive skills such as classifying, assessing relevant information, questioning, and elaboration within the existing scope and sequence of the curriculum. This emphasis on thinking served to remind teachers that specific thinking skills were being addressed and, therefore, highlighted the need for these skills to be taught and reinforced throughout the content areas. "Thinking is both age-free and discipline-free" became our motto.

Next, teachers received an overview of the mastery and thinking strategies, practiced them, and designed implementation plans for their classrooms. Between the three- to five-day training sessions, teachers taught the strategies to their students and used them to teach content material. As the projects progressed, we found that two key ideas were critical to their success: (1) both the teachers and the students needed numerous trials with the strategies or skills in order to achieve mastery and executive control; and (2) the content and the thinking processes could not both be new in one lesson (i.e., teachers needed to introduce a new thinking skill or process with generic or familiar content). [These points have since been validated (Showers et al. 1988)].

Figure 1 (p. 7) shows an example of strategies that have been translated into lessons focused on thinking within content objective mastery. It is important to remember, however, that throughout the training period, generic strategies were presented to teachers. The teachers then taught these strategies directly to their students and later revised and adapted them for incorporation into content areas. Only the final phase is depicted here. Like other educators, we in the Baltimore County Schools have recognized that if teaching and learning are to be successful, we must elicit thinking from students, directly teach thinking processes, and use thinking skills within the content areas.

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