

Restructuring Schools Through the Teaching of Thinking Skills

By incorporating into content areas the skills for learning, understanding, and reasoning, teachers can improve the cognitive abilities of *all* students.

The current perceived need for instruction in thinking skills is partly the result of the growing national awareness that society has changed—skills that were appropriate 15 years ago no longer prepare students for the world outside the school. Such popular works as *Megatrends* (Naishin 1982), *The Third Wave* (Toffler 1980), and *In Search of Excellence* (Peters and Waterman 1982) have argued that the very fabric of the business world has shifted from an emphasis on goods to an emphasis on information. Forbes (1984) states that technology is both creating and destroying jobs. Many clerical and middle management positions are being phased out with high tech replacements. However, the total number of jobs is increasing as technology opens up new work vistas. In short, societal changes are accelerating so rapidly that it is difficult to predict precisely what content to teach students if we define "content" as factual knowledge. The educational implication is that we must change our focus to teaching the skills essential to accessing, organizing, and using information.

Many educational theorists believe that without this instructional shift education will maintain its strong sorting function. For example, sociologist C. H. Persell (1977) documents extensive evidence that public schools are

in the business of sorting and classifying students. In her report, Persell states that "...the institution of education is called upon to maintain, reproduce, and legitimate the inequalities of society" (p. 30). Additionally, Hutchins (1983) and Block (1985) have used data summarized by Persell to build powerful arguments supporting the assertion that schools decide which students qualify for a quality education early in the school experience, and then reinforce that decision throughout the K-12 system by use of teaching and testing practices that are operationally discriminatory.

The present high school dropout statistics are alarming. Approximately 25 percent of the nation's population between the ages of 14-18 years are no longer enrolled in school. Estimates of the size of this out-of-school population run as high as 40 percent in some larger cities where the majority of these youths are also members of minority groups. For example, in New York City, 50 percent of all high school age blacks and Hispanics have left school. Of these 40,000 teen-agers, only 9,000 will find jobs that match their skill levels. And of even greater concern are the vast numbers of high school graduates leaving school who are functionally illiterate, unprepared for existing jobs, and lacking in the knowledge to learn the skills needed

to be productive members of society.

The small percentage of students presently leaving school with skills that are appropriate for functioning in our present (and future) society are able to do so because they have acquired critical thinking skills. Tragically, most of the students who acquire these skills come from the more advantaged socioeconomic strata and thus have the necessary background to glean a knowledge of thinking skills from classroom instruction. Those without such a background pass through the system without acquiring these skills. As school systems identify the thinking skills that ought to be taught, place them in the curriculum, explicitly teach these skills, and then test for skill development, *all* students will have the direct opportunity to acquire those competencies crucial to being successful in the information age.

The thinking skills model described here has the power to restructure schools by affecting the curriculum, instruction, testing, and student learning. Developed by Robert Marzano (for a discussion of the theory behind that model, see Marzano 1985a, 1985b), the model categorizes thinking skills as: (1) learning-to-learn skills, (2) content thinking skills, and (3) basic reasoning skills.

Restructuring The Schools Problems And Prospects Series On Contemporary Educational Issues

Xiaolong Qi



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4e2 4 5 2 if $b = v_1 v_2 \dots v_n$ is a basis of $\mathbb{R}^n$ then the matrix S which contains the vectors v_k as column vectors is called the coordinate change matrix

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notice that the superscript on the transformation matrix m and the subscript on the coordinate vector v are the same and seemingly cancel leaving the remaining subscript

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