

Science

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Societal Issues at the Heart of the Science Curriculum

Every day we hear complaints that schools lack relevance. One way to capture the excitement and relevance of the scientific enterprise is to focus on current issues. According to one estimate, over 90 percent of all issues facing our society today are related to or based on science and technology. If this estimate is accurate, teachers and schools using such issues as organizers are eliminating many problems caused by standard programs that are less relevant and contribute much to student disinterest in science and technology.

Schools organizing their programs around issues report that students learn as much (and, in some cases, more) about typical concepts, facts, and terms while gaining in other ways. Greater student involvement (more time on science) becomes evident as more students elect science study; activity increases within communities on science/technology issues; and community resources and leaders become involved in the schooling processes. As a result, more students use their skills and information from science classes in daily living.

Goals in a variety of areas are approached more directly and with greater ease when issues become the organizer and decision making, application, and personal use become the ends. In fact, teachers who organize their instruction with issues often *begin* with applications rather than hoping they can eventually end up with them.

Eva Kirkpatrick's 9th grade course in Imperial, Missouri, provides a timely example. Her students decided to investigate the issues involved in using a public landfill for city development. After some difficulties, a year-long investigation and a subsequent trial, which the students won, a judge was imprisoned and a scandal uncovered. The students learned more basic science from this experience than would have been possible had they followed a standard course outline.

At Hazen High School in Renton, Washington, teachers weave a societal problem into each chemistry unit and use it to introduce new chemistry material. Students discuss the issue, how to collect data, and find solutions. Often, at the end of a unit, students are able to find how the issue was actually resolved, comparing their ideas to those of others who had opportunities for action.

When teachers consider departing from standard textbooks and course outlines, they are often concerned about how students will perform on standard examinations. The information seems clear on this point. Measures of the acquisition of science concepts and knowledge show that students gain as much in issue-centered courses as in topic-centered courses.

The gains favor issue-centered science, however, when we consider the positive changes in students' attitudes, their ability to make decisions, and their ability to understand, appreciate, and use science later on.

For education leaders concerned with the affective domain, the development of skills such as decision making, and with students' ability to use science actively and wisely, the evidence is clear: teachers who place science-related societal issues at the center of the science curriculum attract more students to science, and students who learn and do more with science are better prepared for the future. □

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Social Studies

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Critical Thinking

A serious and longstanding contradiction is that there has never been a goal so persistently promoted yet so largely missing from social studies lessons as the development of students' ability to think critically. Here is a perennial trend that seems never to settle into

practice. It is now receiving a new wave of interest and support,¹ but, if the past predicts, we should not expect much in the way of successful implementation. What accounts for this predicament, and how might it be overcome?

Underlying Conditions

Three conditions may help to explain the poor implementation record of critical thinking skills. The first is definitional. Critical thinking is not a set of discrete skills that add up to a composite labeled "critical thinking." Rather it

is a disposition—a *stance* one takes in the world—characterized by an acknowledgement of the inadequacy of one's current answers to important questions, an informed skepticism about others' claims to knowledge and value, and an interrogating spirit aimed at conventional wisdom. Because critical thinking cannot be reduced to measurable behavioral objectives without being trivialized beyond recognition, the present curriculum climate that reveres these objectives probably impedes more than promotes critical thinking in the social studies.

Second, it is not altogether surprising that state-run schools, which are expected to socialize students to the *status quo*, might speak kindly of programs that promise critical thinking without taking steps to implement them. Critical thinkers, by definition, question what others may take for granted; they can make those who benefit from current arrangements uncomfortable. (Socrates found this out the hard way.) Critical thinking is inherently a political and historical activity because it calls attention to popular belief systems and social practices that might otherwise escape scrutiny.

Third, probably very few teachers or school administrators are themselves critical thinkers. This is understandable considering the paucity of role models and the virtual absence of critical thinking in *their* schooling. Even Socrates was at a loss to find a critical thinker in Athens. He discovered that even the most respected thinkers of the day responded to his probes by spouting answers they had memorized from their teachers, who, in turn, had probably done the same.

If this accounting is correct, it will not be an easy task for social studies programs to progress toward attaining the critical thinking goal.

Promising Classroom Practice

Programs that encourage students to think critically about their social studies texts and their life experience do exist. Cognizant of the obstacles I've described above, these programs should fare better than those that do not.

First, the programs encourage teachers to think critically about the role critical thinking plays in the social studies curriculum, rather than merely transmitting curriculum directives from above.

Second, the programs engage students in classroom experiences in which they think critically about excerpts from their assigned reading, by examining the author's frame of reference, ideas, and omissions.² In so doing, students begin to understand themselves as *subjects* who intervene in the making of knowledge and have something valid to say about what is given, rather than as docile objects who passively receive the text's "official knowledge." This approach to studying a text, as Paulo Friere has observed, nurtures the critical stance by requiring students to come to terms with the socio-historical conditions of knowledge by analyzing how a scholar's own study and stance can affect the interpretation of events.³

In another type of activity, students apply the same critical disposition they have developed in text analysis to ordinary events in their lives. Consequently, they begin to "read society" with the same informed skepticism as they do texts.

Students' actual experiences in school, at work, with family and friends and in restaurants and stereo shops become living cultural artifacts through which they can examine individual and social relationships firsthand. Described aptly as "extraordinarily re-experiencing the ordinary,"⁴

this approach not only validates students' personal experience and analysis (particularly rare for students whose home cultures are at odds with the sanctioned culture of the school), but like text analysis, it involves students as valued subjects in their own learning. Rather than accepting the circumstances of everyday life as inevitable, reading society encourages students to intervene critically. Without such intervention, what would Jefferson have thought about government, Anthony about gender, and Gandhi about freedom?

Classroom experiences like these clearly require an inventive pedagogy of open discussion and rigorous, active inquiry. Combined with thoughtful attention to conditions hindering critical thinking in social studies, progress should be possible. □

¹The April 1985 issue of *Social Education* features the theme, "Critical Thinking Revisited," ed. Barry K. Beyer. See also Catherine Cornbleth's chapter on critical thinking in *Review of Research in Social Studies Education, 1976-1983*, ed. William B. Stanley (Boulder, Colo.: ERIC Clearinghouse for Social Studies/Social Science Education, 1985).

²Such exercises are elaborated by social studies coordinator Mary McFarland and high school teacher Kevin O'Reilly in *Social Education* (see note 1). Also, see Henry A. Giroux, "Writing and Critical Thinking in the Social Studies," *Curriculum Inquiry* 8 (Winter, 1978): 291-310.

³Paulo Friere, *The Politics of Education* (South Hadley, Mass.: Bergin and Garvey, 1985).

⁴Ira Shor, *Critical Teaching and Everyday Life* (Boston: South End Press, 1980).

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