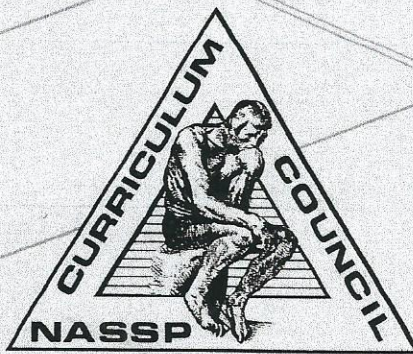


Restructuring for an Interdisciplinary Curriculum

Edited by
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National Association of Secondary School Principals

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Preface

This publication has been prepared at the request of NASSP's Curriculum Committee, composed of practicing secondary school principals from various regions of the nation. It has become increasingly evident to educators that the extended period of curriculum fundamentalism ("back-to-basics") has left the schools with a narrow-minded and fragmented curriculum. Recent developments indicate clearly the need for an integrated core curriculum to meet the function of general education in a free and multicultural society. Growing recognition is being given to the need for the rising generation to understand the interconnectedness of knowledge and to develop the capability of applying this knowledge to the solution of real-life problems.

The introductory chapter not only provides a perspective of past efforts and accomplishments to develop a sense of balance and coherence in the secondary school curriculum, but shows how school administrators and teachers need to build upon that knowledge in the light of contemporary needs. Persistent danger signals are identified in the struggle for curriculum articulation and renewal as we move toward the new century.

Chapter 2 is a teacher's account of how the modest and beginning efforts of four colleagues and their assistant principal resulted in an interrelated curriculum that has grown in only a few years to involve most of the ninth-grade students and faculty, with ramifications throughout the four-year curriculum of a high school. The account is testimony to the capability of teachers with the support of their principal and assistant principal, to conduct action or developmental research for curriculum renewal.

In Chapter 3 descriptions are given of curriculum renewal efforts at three contrasting secondary schools that are among the more than 100 schools nationwide connected with the Coalition of Essential Schools. Chapter 4 presents an account of interdisciplinary team teaching at another high school affiliated with the Coalition.

The curriculum of a "micro-society" magnet school (K-8) serving a multicultural population is described in Chapter 5. In Chapter 6, a case study of an integrated block-time core program in a middle school is reported.

The widely heralded *Project 2061: Science for All Americans*, sponsored by the American Association for the Advancement of Science, is described briefly in Chapter 7. In contradistinction to the national discipline-centered projects in the wake of the cold war and space race, Project 2061 is interdisciplinary (K-12) and designed to reveal the interconnectedness of the sciences and mathematics and their significance to technology and society. Chapter 8 provides a detailed account of interdisciplinary approaches to curriculum design and development through environmental education (K-12), featuring students' engagement in problem solving.

"Writing across the curriculum" is the focus of Chapter 9. The role of the secondary school principal in ensuring the success of a curriculum-wide writing program is examined in some detail.

The final chapter discusses the significance of the contemporary rediscovery of the need for an integrated curriculum. The common threads of the various chapters in this publication are identified along with the implications for the learner, the school, and society.

The editors hope that principals and their teachers will find this publication useful as a source of ideas for faculty study and discussion, and for possible adaptation to local needs in the continual effort for curriculum renewal.

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Chapter 1

Synthesis Versus Fragmentation: The Way Out of Curriculum Confusion

Daniel Tanner

In belated recognition that the curriculum retrenchment of “back-to-basics” has failed, there is growing realization of the need for concerted curriculum renewal. The success of current efforts at curriculum renewal will depend greatly on whether school leaders learn why the failure of curriculum retrenchment was inevitable, seek to develop an articulated and enriched curriculum, and strive to build upon the vast body of research literature on curriculum articulation or synthesis. What does history teach us about the vagaries of curriculum integration?

A Persistent Problem

An articulated and enriched curriculum to meet the common and diversified needs of a polyglot pupil population in the secondary school has been a persistent problem throughout this century. This need is no less crucial today than after World War I when the Commission on the Reorganization of Secondary Education issued its landmark *Cardinal Principles* report (1918). This report signaled a veritable revolutionary transformation of the American secondary school and the curriculum.

In the nineteenth century, vast industrial growth gave impetus to the movement for universal public elementary education to provide the rising generation of workers with the fundamental skills required for their jobs (Bernal, 1971). The masses were to be provided a cheap curriculum for “basic literacy,” while the privileged enjoyed a full and enriched curriculum.

Early in the century, John Dewey observed that when efforts were made to enrich the curriculum for the masses, these efforts were dismissed by the more privileged as “fads and frills” who were well aware “that their own children would be able to get the things they protest against” (Dewey, 1916).

Prototype of American Democracy

Immediately after World War I, enormous pressures were exerted to create a dual system of secondary education patterned after the European tradition. However, embracing the powerful rationale of the *Cardinal Principles* report, our nation opted for a uniquely American unitary school structure through the coeducational comprehensive high school—the cosmopolitan school embracing all curricula. “In short,” declared the report, “the comprehensive school is the prototype of a democracy in which various groups have a degree of self-consciousness as groups and yet are federated into a larger whole through the recognition of common interests and ideals. Life in such a school is a natural and valuable preparation for life in a democracy” (p.26).

Recognizing that the curriculum in such a school would need to be diversified while also providing for a sense of unity in a cosmopolitan pupil population, the framers of the *Cardinal Principles* report envisioned the curriculum as structured around a core of “constants” for all students, coupled with diversified studies or “variables” to meet individual differences.

At the same time, the report warned against tracking, attacked the doctrine that the traditional academic curriculum is the only acceptable preparation for college, and contended that the pursuit of vocational studies in high school should not be seen as a deterrent to the pursuit of higher education. “In view of the important role of secondary education,” stated the report, “it follows that higher institutions of learning are not justified in maintaining entrance requirements and examinations of a character that handicap the secondary school in discharging its proper functions in a democracy” (pp. 19-20).

Common and Diversified Needs

In calling for a common core of “constants,” the authors of the *Cardinal Principles* report made it clear that the core would not simply be a list of traditional departmentalized academic subjects, but would be articulated to meet the democratizing function of education. This would require special precautions against allowing the departmentalized subject structure of the high school to determine the objectives and functions of education. Instead, the objectives and functions of education should determine the organizational structure of the school and the curriculum.

In this connection it was pointed out that when “the only basis upon

which a high school is organized is that of the subjects of study, each department being devoted to some particular subject, there will result an over-valuation of the importance of subjects as such, and the tendency will be for each teacher to regard his function merely that of leading the pupils to master a particular subject" (p. 27).

The ensuing decades up to World War II witnessed unprecedented efforts in curriculum reconstruction in the secondary school and college to meet the common and differentiated needs of a cosmopolitan student population as the United States led the way in embracing the ideal of universal secondary education.

The great educational transformation through the upward extension of educational opportunity required a great curriculum transformation. Progressivist-experimentalist educators held that the tradition of *basic education* or *literacy education* for the masses and *liberal* education for the privileged was untenable in a democracy.

The Idea and Practice of General Education

As a consequence, the idea of *general education* (not to be confused with the general curriculum track) gained great impetus in the quest for a core curriculum to provide for a common universe of discourse, understanding, and competence required of all citizens in a free society (Harvard Committee, 1945). It was becoming increasingly clear that the fragmented subject curriculum merely perpetuated the isolation of knowledge and was inadequate to the task of building a meaningful common core of learning.

The proliferation of segmental subjects was countered by the creation of broad fields and combined fields. Progressivist-experimentalist educators devised various new curricular designs to combat teacher isolation and to provide for curricular correlation and synthesis. Efforts were made not only to correlate subjects that until then had been treated in isolation, but to develop thematic and life-related, problem-focused studies that cut across the traditional subject boundaries.

Leading progressivist-experimentalist schools sought to organize the learning experiences in the new curricular designs to foster reflective or critical thinking. Unprecedented efforts were undertaken to systematically evaluate the outcomes of the experimental designs for general education and to challenge the traditional dominance of the colleges over the secondary-school curriculum (Aikin, 1942; French, 1957).

The Eight-Year Study (1933-1941), one of the largest-scale longitudinal investigations ever undertaken in the field of education, involved compar-

ison populations and revealed that the traditional college-preparatory curriculum was not the best way to prepare students for college. The participating colleges reported that the students from high schools having more integrative curricular designs were more successful in college than their peers who had completed a traditional college-preparatory curriculum (Aikin, 1942).

Despite the endorsement of the findings of the study by the Association of American Colleges, the advent of World War II blunted the impact of the study. In the face of the mobilization emergency, the high schools curtailed their curricular experimentation, established double-shifts to accommodate enrollment pressures, limited facilities as school construction came to a virtual halt, and devised shortened and accelerated avenues to graduation to meet the nation's emergency manpower needs.

Counterreactions

The vast requirements for school construction following World War II gave renewed impetus to the tax conservatives who favored curtailment to the cheap curriculum of basics in the elementary school and the traditional academic subjects in the secondary school. The rise of McCarthyism produced a new wave of censorship of curricular materials and widespread avoidance of controversial issues in the curriculum.

The cold war and space race were accompanied by demands from varied quarters that we restructure our schools along the divided and selective lines of European nations and that we abandon the comprehensive high school. In the words of Admiral Rickover, "we no longer have a choice between efficient education—that is, separate schools above the elementary levels—and pure 'democratic' education which insists on the inefficient time-wasting comprehensive high school. We must opt for efficiency" (1963, p. 89).

Fortunately, a single report by James B. Conant on the American high school (1959) upheld our unitary school structure and the comprehensive high school at a time when other democratic nations were beginning to move toward the comprehensive model as a means of extending educational opportunity to the rising generations.

Nationalizing Influences

Nevertheless, the "Soviet challenge" of the cold war and space race witnessed unprecedented federal funding for curriculum reform in the ele-

mentary and secondary school, giving priority to the sciences and mathematics. The knowledge specialists in the university proceeded to embrace the discipline-centered doctrine of knowledge purity and abstraction as they promoted their own disciplines in isolation of the wider world of knowledge and action. They overlooked, ignored, or even dismissed the most fundamental factors in the educative process, namely:

- The nature, needs, and interests of the learner
- The significance of practical application of knowledge in ordinary life
- The function of the curriculum in developing an enlightened citizenry in a free society (Dewey, 1902, pp. 4-8)

In embracing “disciplinarity” as the ruling doctrine for curriculum development, emphasis was given to specialized knowledge to the neglect of knowledge synthesis and general education. Not only did the curriculum become further divided and isolated into discrete disciplines, but the priority given to the sciences and mathematics resulted in a new knowledge hierarchy with the accompanying problem of curriculum imbalance.

In the aftermath of the “new math,” the “new physics,” the “new chemistry,” and the bandwagon of other national discipline-centered projects led by university scholar-specialists, it was discovered that students lacked the ability to make relevant knowledge applications. Moreover, in ignoring the other fundamental factors, it was found that the national goal of producing more physical scientists and applied mathematicians through the national curriculum reforms had backfired as fewer students went on to major in these fields in college despite the mushrooming college enrollments (Ellis, 1967).

Appraising the national discipline-centered curriculum projects of the 1950s and 1960s, the director of the Oak Ridge National Laboratory observed, “The professional purists, representing the spirit of the fragmented, research-oriented university, took over the curriculum reforms, and by their diligence and aggressiveness, created puristic monsters” (Weinberg, 1967, pp. 153-154).

The late Richard Feynman, Nobel laureate in physics, described the “new math” as “an abstraction from the real world . . . used by pure mathematicians in their more subtle and difficult analyses, and used by nobody else” as he went on to criticize the “new math” as “full of such nonsense” (1965).

Demand for “Relevance”

As educators were beginning to awaken to the need for a redesigned curriculum to provide for synthesis and balance, the shock waves of student

protest and disruption struck the college campuses in reflection of the civil-rights movement and the Vietnam war. The great prospects of the war on poverty were virtually dashed by the war in Vietnam, as promising federal educational programs for disadvantaged children and youth were reduced to relatively modest goals.

In response to the student demand for "relevance" in the college curriculum, the colleges took the path of least resistance. Instead of restructuring the undergraduate curriculum to provide for a coherent program of general education, the colleges simply instituted a proliferation of new courses on virtually every topic that was deemed "relevant." Students were allowed increased elective options in place of general education. At the same time, the specialized curricula in the traditional departmental major fields remained virtually undisturbed.

As the college-student disruption filtered down into the high school, the response was to imitate the colleges by introducing more electives on *au courant* topics. The consequence was the further fragmentation of the curriculum and the failure to address the need for curriculum balance and synthesis.

Although the proponents of the new humanities courses in the high schools claimed that these courses provided for interdisciplinary studies, in many schools the student enrollments in the humanities courses and the black studies courses reflected the social divisions of the wider society. The need to "humanize" the schools and develop interdisciplinary curricular designs was discussed, but no concerted efforts were made in these directions in the face of the easier path of special-interest electives.

Retrenchment

The 1970s witnessed a counterreaction of educational retrenchment. National reports on educational reform were attacking the high school for its increased holding power, contending that most adolescents did not belong in high school and that the high school curriculum be reduced mainly to academic studies (National Commission on Reform of Secondary Education, 1973; Panel on Youth, 1974; National Panel on High School, 1976).

Strangely, some of the radical school critics and gurus of the counterculture of the 1960s were taking the position that the high school cater exclusively to academically oriented youth while leaving other youngsters to find other means of making their way into society, or by separating them from their peers through a divided system of academic and vocational schools (Friedenberg, 1967; Goodman, 1970). The federal Vocational Education

Act of 1963 had indeed provided the means for such separation on either a full-time or shared-time basis in area or county vocational schools.

The counterreaction of curricular retrenchment of the 1970s was heralded by the slogan, "Back-to-Basics." Worksheets and workbooks proliferated. Textbooks were "dumbed down" to the neglect of ideas and higher-order thinking (California Curriculum Commission, 1984).

Expenditures for books and other curricular materials declined by 50 percent over a 17-year period so they amounted to only 0.7 percent of the operating costs of schools (National Commission on Excellence, 1983). To meet the pressures of minimum-competency and standardized-achievement tests, teachers were expected to "teach-the-test."

One of the unanticipated consequences of the "back-to-basics" retrenchment (which should have been anticipated) was the decline in writing ability and thinking ability. Whereas the great American tradition of pragmatism and experimentalism had embraced the idea of social progress or progressive social improvement through the means of public education, leading professional education journals were featuring articles on "managing education's era of decline" (Divoky, 1979). Nevertheless, the American public's belief in education remained unshaken as succeeding generations of parents sought to secure increased educational opportunity for their children.

New Nationalizing Influences

The decade of the 1980s was marked by a new nationalistic wave for educational reform reminiscent of the cold war and space race. But this time the priority to be given to the sciences and mathematics was directed no longer at the "Soviet challenge" but at the "Japanese challenge."

In apparent contradiction, the national reports on educational reform blamed the schools for the decline of U.S. dominance over world industrial markets in the face of Japanese competition, while at the same time the reports contended that our schools should be revamped to meet our future as a service economy rather than a production economy (National Commission on Excellence, 1983). Ironically, no criticisms were leveled at the shortcomings of our industrial, business, and political leadership, or at our institutions of higher education. Paradoxically, the call was for adopting the managerial techniques of American business in administering our schools.

"Schools of Choice"

The 1980s also found renewed support for restructuring the schools and establishing special-interest schools. Whereas the federal efforts to promote

school vouchers and alternative schools had failed to capture public support during the 1970s, the new label of the 1980s, "schools of choice," proved to be more attractive.

Proponents of "schools of choice" were neglecting the danger signals of creating a divided and fragmented system of schools geared to serving special-interest constituencies (Raywid, 1990). They failed to recognize the historic struggle, beginning early in our century, for the creation of a unitary school system as opposed to the divided system of the Old World.

The Comprehensive High School and the Comprehensive Curriculum

Historically, the comprehensive high school had been opposed from its inception by those from the political right. However, by the 1980s it was being attacked not only by political conservatives, but also by those who viewed themselves as advocates of educational opportunity. In attacking the comprehensive high school, they revised our history to portray this unique American institution as an instrument of social division. They confused pupil grouping with tracking and erroneously held that a diversified curriculum was synonymous with tracking (Oakes, 1985). They saw the high school as appropriately limited to an academic curriculum for all youth.

In effect, they failed to recognize general education as the unitary function of a comprehensive curriculum in which students would also have the opportunity to meet their varied needs through diversified prevocational and vocational studies, college-preparatory studies, exploratory studies, enrichment studies, and special-interest studies. They took no cognizance of the rich literature in the curriculum field showing how general education and the diversified studies that comprise the curriculum can be treated in their vital interdependence.

In the metaphor of the Harvard Report (1945), general education should be seen as the palm of the hand, with the five fingers of diversified studies stretching out beyond the common core (p. 102). As an illustration of this vital interdependence, many a scientist, engineer, and skilled tradesperson has commented on the great usefulness of the studio arts in the school curriculum in developing their ability to make line drawings, sketches, and diagrams so essential to their professional work, not to mention the value derived from these arts in general education, enrichment education, and developing special interests and talents. The same applies to the value of

the industrial arts which also provide a laboratory for cooperative learning. In the words of the Harvard Report:

The manipulation of objects, the use of tools, and the construction of simple apparatus all are required for entry into the world of experimentation. Even the pure mathematician is greatly aided by shop experience; the forms, contours, and interrelations of three-dimensional objects provide a stimulus and satisfaction not to be achieved altogether within the limits of plane diagrams. The lack of shop training is at present a most serious deterrent to entry into all types of technological work and to college and postgraduate training in science, medicine, and engineering (p. 160).

Persistent Danger Signals

At long last, we are witnessing a rediscovery of the need for curricular balance and unity. There is renewed recognition of the significance of critical thinking as a function of the curriculum, and of the need to develop the fundamental processes, such as writing, throughout the curriculum.

Various professional educational associations are seeking ways of regenerating the school curriculum through interdisciplinary designs directed at revealing the social significance of knowledge, such as the interfaces of science and society. There is renewed recognition that history and the social studies should not be taught apart from literature, and that mathematics should not be taught apart from the sciences or without useful application in the life of the learner (American Association for the Advancement of Science, 1989).

Nevertheless, danger signals persist. In the pursuit of academic excellence, children and youth at risk are neglected. Vocational education within the mainstream of our high schools continues to suffer from inadequate funding and recognition. Perennialists and essentialists continue to promote a narrow notion of the mission of the school as the mere transmission of basic knowledge under the rubric of "cultural literacy" (Bloom, 1987; Hirsch, 1987).

The "new basics" are being fashioned and promoted by special-interest groups in a host of fractionated forms of "literacy," reflecting the fragmentation of the curriculum and society.

For children and youth who are socioeconomically impoverished, there is the traditional "basic literacy." For all others, there is a multitude of literacies competing for a place in the congested curriculum: "cultural

literacy," "computer literacy," "mathematical literacy," "scientific literacy," "economic literacy," "political literacy," "aesthetic literacy," "technological literacy," and so on.

Standardized achievement tests drive the curriculum as never before. Despite the exceedingly low validity of these tests as predictors of academic or college success, they have been promoted by the media as scientific gauges of educational failure or effectiveness.

These tests have been used by school administrators—under pressure from the media, school boards, parents, and politicians—as evidence that their own schools are above the national norms. (Most school districts can make this claim despite the statistical impossibility, simply because the norms for the tests are several years old and new norms are not available until new tests are developed.)

Teachers are pressured to teach-the-test, resulting in improved test scores, but not real gains in achievement (Linn, Grave, and Sanders, 1990; Madaus, 1988). Real achievement in education and life is based on motivation and power, not the speed and nervous energy of test-taking. Because these tests are limited to narrow segments of the school curriculum, they convey the message that only these segments really count.

Balance and Unity in the Curriculum

From our rich heritage in the curriculum field, we can solve the persistent problem of curriculum congestion, fragmentation, and isolation by assuming a more holistic rationale and drawing upon the proven practices in curriculum development, as illustrated by the following (Tanner and Tanner, 1987, pp. 517-523):

- Instead of thinking of curriculum development as merely a segmental process of adding, deleting, and revising individual courses and requirements within the departmental cocoons, it is seen as a holistic and continuous process. The focus is on the macrocurricular functions of general education or common learnings (requiring a core of unified studies for all), along with exploratory, enrichment, specialized, and special-interest studies to meet the diversified needs of a cosmopolitan student population.
 - Standing interdepartmental committees are organized to address the above macrofunctions of the curriculum. The work of these committees is guided by the principle that the value of any subject or study is determined by what it contributes to other studies in the total curriculum.
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- No useful purpose is served in placing students in curricular tracks. A school having a comprehensive curriculum and a cosmopolitan student population will find that students will pursue diversified studies in accordance with their perceived interests, needs, and advice from teachers, counselors, parents, and peers. The challenge is to capitalize on the cosmopolitan quality of the student population by developing a sense of unity through diversity by means of the common core of general education. The problem is not how to separate students, but how to bring them together.
 - The curriculum is restructured through designs for correlated, interdisciplinary, problem-focused, and thematic studies that reveal the interdependence of knowledge and the uses of knowledge in the life of the learner and in the life of the wider society. There is a coherent curriculum in general education rather than elective requirements.
 - In restructuring the curriculum, emphasis is given to idea-oriented, problem-focused studies as opposed to error-oriented teaching. The former are of interest to students from a wide range of backgrounds and abilities and are more stimulating than error-oriented approaches consisting of disjointed facts and narrow skills. Skills are best developed through meaningful and useful contexts. Facts are not synonymous with knowledge; they must be transformed into the working power of intelligence.
 - The supervisory program treats curriculum, instruction, and learning as interdependent.
 - The balance and coherence of the curriculum is maintained in the face of any special priorities that may be established for the school (e.g., priority given to science and mathematics is not at the expense of other studies). The curriculum is not dominated by the college-preparatory function, but is designed to meet the needs of a cosmopolitan student population.
 - The responsibility for designing and developing the curriculum resides with the professional staff of the school district and school. (Although states may mandate specific subjects for high-school graduation, they do not mandate how the subjects are to be organized and treated in the curriculum.)
 - Student assignments and homework stimulate interest in learning. Homework is not mechanical drudgery.
 - Teacher-made tests are focused on higher-order thinking and problem solving related to life needs. These tests are used by the teacher to evaluate the teacher's success in effecting student growth.
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- Standardized achievement tests are not allowed to drive the curriculum. Nor are they used for segregating or tracking students. Such tests are used appropriately for diagnostic purposes.
- The school schedule is designed to facilitate the curriculum, not to constrain it. Scheduling considerations do not result in student tracking.
- Textbooks do not determine the courses of study, but are used along with a rich variety of curricular materials, resources, projects, and other activities for productive learning.
- Teachers are free from external constraints and pressures that may lead to the censorship of the curriculum or of curricular materials, or to teacher self-imposed censorship. Teachers are free to teach so that students may be free to learn.

Past, Present, and Future

There is much to be learned from our curriculum history. Instead of following the dominant tide of the times or current cycle of educational reform, educators must build upon the best available knowledge so real progress can be made. Otherwise the schools become vulnerable to fads and to repetitive and conflicting cycles of reform and counterreform. Priority given to one area of the curriculum is taken in opposition to another area. Priority given to one pupil population is taken at the expense of another population.

American democracy requires that the widest public interest is served through the public school. In effect, as Dewey pointed out, the real essentials of the curriculum are "the things which are socially most fundamental, that is, which have to do with the experiences in which the widest groups share." Consequently, "the scheme of a curriculum must take account of the adaptation of studies to the needs of existing community life; it must select with the intention of improving the life we live in common so that the future shall be better than the past" (1916, p. 225).

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