

Needed: A Whole-Curriculum Approach

Promising efforts are under way in both the commercial and nonprofit sectors to give schools the resources they need to improve all aspects of the curriculum process, from planning to assessment.

As the idea of holism opens new ways of approaching science, the environment, and our health, educators are beginning to advocate holistic approaches to teaching and learning. This trend signals a growing appreciation of the intercon-

nectedness of things and recognition of the truth of the adage, "The whole is greater than the sum of its parts."

Holistic approaches to teaching and learning represent a rebalancing of educational practice away from its more than half-century old behaviorist/reduc-

tionist bent. Current examples abound: teaching writing and reading simultaneously with the whole-language approach, teaching vocabulary by means of semantic clusters of conceptually related words, and teaching mathematics so that students understand overarching mathematical ideas and relationships.

After all, the behaviorist/reductionist habit of dissecting what is to be learned into discrete facts and skills makes it difficult for learners to achieve levels of understanding that are greater than the sum of those discrete facts and skills. And given the fact that schools are being challenged to teach more than facts and skills, it's not surprising that teachers are seeking ways to encourage learning holistically.

However, the benefits of holistic thinking must not be recognized only at the level of innovative instructional practice; they must be realized at the curriculum policy and planning levels of education as well. This century has witnessed a continuous parade of innovation at the micro-level of classroom practice—from the "project" and "contract" methods of the '20s and '30s, to "programmed instruction" and "CAI" of the '60s and '70s, and to "microcomputers" and "cooperative learning" during the '80s. However, there is a deficit of macro-level strate-

Photographs courtesy of Macmillan/McGraw-Hill



The computer is playing a key role in many efforts to support a whole-curriculum approach; shown here are students in the Hampton Township School District in Pennsylvania.

gies capable of turning the best of these instructional innovations into significant curricular change. If holistic thinking is to infuse the macro-level of curriculum policy, planning, implementation, and assessment, a *systemically balanced* (Komoski 1987) or *whole-curriculum* approach to teaching, learning, and assessment must replace the fragmented, skewed activities that have characterized curriculum far too long.

Assessing Curriculum Wholeness

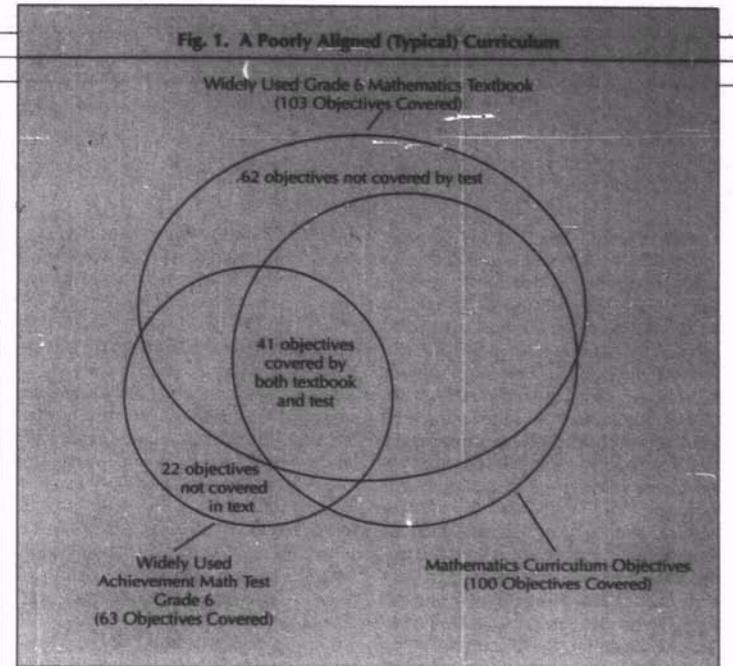
A valid set of systemic parameters of curriculum wholeness was succinctly outlined almost 40 years ago in the form of four inescapable educational questions (Tyler 1949). The questions are "inescapable" because, even when not asked explicitly, they are being answered implicitly every day in every school across the country. Slightly rephrased for the 1980s, the questions are:

1. What educational purposes is this school, district, or state seeking to attain?
2. Are we providing a range of learning experiences that are likely to facilitate the attainment of our school's educational purposes?
3. Are we effectively organizing those learning experiences and making them readily available to learners?
4. How well are we determining that our school's educational purposes are being attained (by means of those learning experiences we have provided, organized, and made available to learners)?

To these four questions, I propose a fifth, which I find implicit in Tyler's reference to the "necessary interrelations" (Tyler op. cit., p. 128) among the activities addressed in the first four questions:

5. Are we striving to maintain dynamic interrelatedness (i.e., wholeness) among the curricular activities called for by the first four questions by continuously re-asking and re-answering those questions?

This fifth question focuses on curriculum as an adaptive, dynamic process. For example, if a school is contemplating a shift to the teaching of



science through hands-on lab work and field studies of the local environment, this question alerts us that students who are taught in a new way should be tested in a manner compatible with that new way.

This example honors a universal truth about healthy systems: each part of the whole has a coherent and enhancing interrelatedness to all other parts. Sensitivity to this concept of interrelatedness is essential to *all* well-informed, well-rounded, and ongoing curricular reform. Most school curriculums, however, do not provide students the appropriately varied, yet coherent teaching, learning, and assessment experiences that are the hallmark of curricular integrity. First, let's examine the reasons why curriculum is fragmented. Then we'll look at some positive indicators of movement toward curriculum wholeness.

Why Curriculum Is Fragmented

For more than 20 years, I have observed hundreds of students, teachers, curriculum specialists, and administrators and reviewed analysis after analysis of school curriculums (the major elements of which, when diagrammed, all look disturbingly similar to the poor alignment revealed in Figure 1. And I continue to ask myself, "Why are there still such wide—and widespread—discrepancies

between what (and how) schools *teach* and what (and how) they *test*?"

Setting the question into a larger frame: Why is there such a lack of curriculum wholeness? The answer is multifaceted. To begin with, even though a school administrator may know intellectually that such discrepancies undermine curriculum wholeness, structural and budgetary constraints and political realities often make it difficult to act on that knowledge. The major reality is our addictive dependency on the use of commercial, standardized, nationally normed testing programs to produce scores that provide evidence of a school's year-to-year performance and accountability. The feeling that "everything's fine," which so often accompanies a school's annual distribution of its test scores, seldom prompts curricular rethinking and reform. What's more, the attainment of curriculum wholeness is hampered by the bureaucratic turfdoms associated with the selection and purchase of textbooks, media resources, and tests. As each turfdom works to protect its decision-making and budgetary prerogatives, curriculum planning often becomes truncated and fragmented (Komoski 1987).

But even if structural problems are kept in check, curriculum wholeness is hindered by within-grade misalignment of texts, tests, and local and state curriculum guides (fig. 1). This subtle but

serious problem has recently become discernible as a result of advances in computer-aided curriculum analysis (EPIE 1988). Typically, 30 to 60 percent of the textbook that teachers are working hard to cover by June may not relate to their curriculum objectives and/or the school's standardized achievement test for the grade they are teaching (see fig. 1). Thus, instead of ensuring educational cohesiveness and intellectual integrity, the curriculum gets reduced to "covering" the textbook and supplementing it with materials designed to help students perform well on standardized tests that may or may not align with other major curriculum elements (at the macro-level) and that provide little feedback to teachers and learners (at the micro-level) that can help improve teaching and learning. In addition, the test in question often fails to assess (Marzano and Costa 1988)—and the textbook fails to address (EPIE 1988)—the higher-order understandings and skills that schools are being challenged to impart.

Any resemblance between such practices and a well-conceived, well-implemented, and well-assessed cur-

riculum is fantasy. Yet this fantasy is curriculum *reality* in many, perhaps most, U.S. schools. It is a reality that must be changed.

Curriculum Reification and Rigidity

Schools will not be substantially improved by something as rudimentary as raising students' standardized test scores or by refocusing instruction away from the teaching and learning of discrete facts and skills toward larger loci of learning. School problems are related to the much deeper conceptual and operational confusion about curriculum that characterizes school practice today.

Conceptually confused or not, curriculum exists in every school and, depending on the level of confusion, is made operational either thoughtfully or expediently. If thoughtfully, it is treated as a dynamic process. If expediently, it quickly becomes thought of as a thing, a product, or a collection of things or products. Such reified curriculums stay rigidly in place for years, even though, after some use, the adopted products may prove to be flawed, inappropriate, or simply out of date.

Curriculum as product distorts curriculum as process. When the products are treated as the curriculum, rather than as one of many alternative means to achieving a school's curricular ends, the result is student learning that is neither full nor fulfilling. The dynamic holistic richness that should characterize every school's curriculum gets reduced to these two macro-level standardized parts (texts and tests), neither of which provide the micro-level richness of learning experiences and assessment feedback requisite for more effective teaching and learning.

The confusion is reflected in two frustrating ironies. First, although our societal expectation is that *schools will develop every child's potential as a learner*, the average student's dominant learning experience arrives via the least individualized learning medium available—the textbook (Cronbach 1955, EPIE 1977). Second, in a misguided effort to improve schools, legislators and laypersons alike sup-

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port testing programs that are designed to monitor group performance annually rather than to improve individual performance from day to day.

A major step toward clearing up much of this confusion will occur when we agree that curriculum is not a thing nor the simple aggregate of things like curriculum guides, textbooks, other teaching materials, and tests. All such things are the tangible products schools use to implement an intangible concept called *curriculum*. Curriculum, when encompassed as a whole yet reduced to its essentials, may be described as the process of *thinking-through, facilitating, and assessing the learning of intended educational ends*.

Such things as curriculum frameworks and guides, with their lists of objectives and learning outcomes, provide tangible evidence of the thinking-through of such ends. Textbooks, other learning materials, and tests provide tangible means for facilitating and assessing the achievement of such ends. However, when we permit textbooks, other materials, and tests to become curriculum, we are allowing means to become ends.

To a great degree, the wholeness of curriculum depends on the ability of schools to envision and bring about



Computers can provide variety in learning experiences without permission slips and bus trips.

new means of facilitating and assessing new levels of educational ends. In short, the idea of achieving real school improvement without improving the tools of teaching, learning, and assessment is simply nonsense.

Efforts Toward Curriculum Wholeness

Given all this curriculum unwholeness, are there any indications of movement toward the curriculum health and wholeness advocated here? I am happy to say there are. A number of conscientious efforts have begun to provide schools with the tools to improve all aspects of the curriculum process, from planning to assessment. Some focus primarily on the macro-level of the process; others on micro-level means of classroom curriculum implementation; a few address both. Together they represent positive movement toward a different future for teaching, learning, and assessment—for curriculum *as a whole*.¹

Without doubt, the largest effort toward a holistic approach to curriculum is the state-level initiative that has been under way in California for several years. Its scope includes:

1. the development (at the macro-level) of a Curriculum Framework and the generation of a Model Curriculum Guide for each subject area by statewide committees in order that students (at the micro-level) achieve a deeper, more holistic understanding of what they are learning;
2. a textbook adoption process designed to encourage the selection of textbooks that support that intent;
3. encouragement (including financial incentives) for developers of electronic learning materials to create computer and multimedia software that similarly support the intent of the state's curriculum framework;
4. the provision of curriculum-correlated information to schools about readily available computer and video software products to facilitate student learning;
5. the development of a statewide testing program to assess the extent to which learners are achieving agreed-upon statewide educational ends.

To support this macro-level alignment of guides, texts, supplementary materials, and tests at the micro-level, the initiative includes a program of teacher-training workshops provided by county education offices to help teachers develop holistic classroom teaching strategies.

The Comprehensive Assessment System further supports the state's initiative at both macro and micro levels. Local districts use this system to create tests that contain questions that may also be used for statewide assessment purposes. Although state monies allocated for this work were twice vetoed by the governor, local districts cooperatively raised monies for the current pilot project under the leadership of their superintendents (Honig 1988).

Another effort designed to support the California initiative through county-level leadership is a cooperative project between a number of counties and the Educational Products Information Exchange (EPIE) Institute, an independent consumer information agency. The project's aim is to help local schools make well-informed decisions about which textbooks align best with the state and local curriculums and testing programs (EPIE 1988).

Another noteworthy state-initiated effort is Minnesota's development of a flexible, customized approach to testing and assessment, which enables local districts to establish programs that serve both their own and their state's accountability needs. The heart of the program is a text/graphics test item bank for five major curriculum areas. The item bank was developed by the Minnesota Department of Education's Assessment Section with the cooperation of teachers and curriculum workers statewide. Originally only schools on-line with the state's mainframe computer could use the item bank. In late 1987, however, the department published the item bank electronically on CD ROM. Now local districts need only a PC and a CD ROM drive to make unrestricted use of the system.

In Georgia, one county school district and the State Department of Education are cooperating to break the

pattern of textbook domination of science teaching. This multiyear effort, partially funded by the National Science Foundation, helps teachers identify high-quality computer and video software to correlate with their curriculum and to broaden the range of learning experiences available to students. This rather tightly focused "media-saturation" and teacher training strategy in science and mathematics is related to a larger statewide program. In the larger program, the State Department provides teachers a building-level collection of hundreds of non-textbook resources aligned with state-approved curriculums and textbook lessons in all curriculum areas. County teachers also receive support in their use of these resources from a state-certified, in-building instructional specialist.

Efforts in the Commercial Sector

If efforts to change curriculum thinking and practice in schools are to succeed, we must also experience complementary efforts within the education *industry*, particularly among textbook publishers. Many publishers seem convinced that in at least one curriculum area, reading/communications, schools *are* going to purchase teaching materials that reflect the whole-language approach. However,

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in other curriculum areas, textbook publishers in particular are taking a wait-and-see attitude about breaking with traditional materials.

Nevertheless, there are serious efforts that may prove supportive of the whole-curriculum approach. All have one thing in common: the computer and its applications and implications. For example, a few major textbook publishers are considering publication of customized electronically produced textbook lessons. With customized publishing, it would be possible to produce text materials in the form of individual lessons presumably drawn from *lesson banks*, not unlike the test item bank from which Minnesota schools can select and organize customized tests. The lessons could either be bound together or electronically delivered and printed out as separate lessons. If such lessons were coupled with locally designed well-aligned curriculum-referenced tests, a school would be well on its way to enjoying a whole-curriculum approach.

At present, the customizing of textual materials remains little more than an attractive idea. However, one of the country's largest textbook publishers, McGraw-Hill, began testing the water in 1987 with its appointment of the former curriculum director of a large urban school system to the post of vice-president for electronic and customized textbook publishing. Of course, customized texts would be helpful in breaking the historic hold of conventional textbooks on teaching and learning, but they would represent only a partial answer to the question, "Are we providing learning experiences that are likely to achieve our schools' educational purposes?"

Customized texts would not solve the need, for example, for more variety in learning experiences. Here again the computer enters the scene, both as an electronic learning environment and as a manager of multimedia learning experiences. That all media, not just print, may now be digitized holds the promise that teachers and students will soon be using computers to access all types of mediated teaching and learning experiences. In order for them to do so, each mediated



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experience will have to be correlated to desired learning outcomes.

Currently, a number of efforts in both the commercial and the non-profit sectors are helping schools to integrate curriculum-referenced media into their curriculums. Since 1986, for example, Apple Computer has produced a number of publications that contain correlations of high-quality educational software to many common curriculum goals. Apple's success in this area has not as yet resulted in similar initiatives by other computer manufacturers; however, there are strong indications that IBM may soon be moving in this direction.

Competition is vigorous among companies that produce integrated hardware and software programs. On the one hand, such integrated instructional systems (IISs) can be little more than a computerized version of a standardized textbook, albeit an interactive one, that can lock a school into a set of curricular and instructional decisions not of its own making. On the other hand, such a system can also become a tool for breaking the stranglehold that the traditional textbook has on curriculum in so many schools. Which of these two scenarios obtains depends on how committed a school is to developing and sustaining its own educational ends (EPIE 1989).

The dual scenario derives from the fact that, although the IIS concept originated 20 years ago as narrowly focused drill-and-practice CAI systems using computer terminals networked to a mainframe computer, a mix of market forces, the microcomputer, and vision on the part of some IIS developers are making these systems more responsive to the needs of schools. Once limited to proprietary hardware and software, some systems now allow a school to use its own computers on their networks; at least two companies also allow their systems to run software other than their own. If such software can be run under the instructional management and assessment applications of these IISs, teachers could construct computer-managed learning experiences that could prove more effective than either traditional textbook-based or regular IIS teaching.

At present, the commercial-sector effort with the most potential to provide schools with a technological means of achieving maximum curricular flexibility, integration, and wholeness is the Education Utility (Gooler 1986). This technologically open electronic delivery system enables a school to select, integrate, and manage the use of all types of available learning materials and testing in relation to its curriculum goals.

The system enables a school to receive, store, integrate, and distribute curriculum materials and information services via a networked satellite/computer/video/laser technology. Using this technology, schools may electronically select, access, and integrate materials and services from national and regional organizations, educational publishers, software vendors, and nonprofit and public agencies. The school's "regional education utility" arranges for electronic delivery and metering of the school's selections, which are paid for only as they are used—the way electricity is paid for from a regional power utility. The first regional *education* utility, the Arizona Information and Education Utility Corporation (a subsidiary of National Information and Education

Utility Corporation), began serving schools in 1989.

Efforts in the Nonprofit Sector

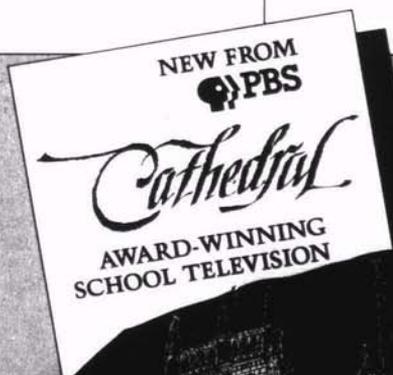
In the nonprofit sector, there are also noteworthy efforts supportive of a whole-curriculum approach. For instance, curricular correlations of educational video software (similar to the computer software correlations distributed by Apple) are being distributed to schools in print form by the Corporation for Public Broadcasting and the Agency for Instructional Technology. As good-quality computer and video software become available, schools will be able to collect enough nonprint media

to provide learners a broad array of curriculum-referenced learning experiences that more than supplement traditional textbook instruction.

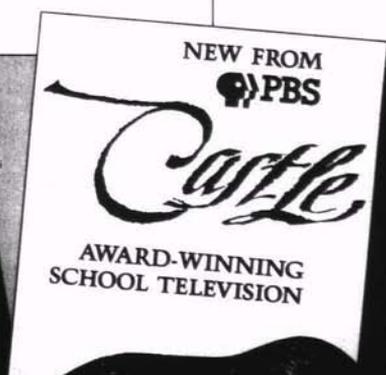
Two nonprofit computer-managed database efforts were launched in 1986 to help schools correlate curricular elements electronically. The first of these, Curriculum Connection, is a computer-searchable database of television software created by WVIZ, an educational television station serving the Cleveland area. Schools use the database to locate and integrate well-designed television software into local curriculums. Last

year, the database's availability was expanded to schools in eight other television markets throughout the country.

The second database effort is EPIE Institute's Integrated Instructional Information Resource (IIIR). The IIIR comprises a set of relational databases of precisely coded information about the content and learning outcomes found in curriculum guides, textbooks, other materials, and tests. It is capable of aligning computer software, video, and other learning materials, individual textbook lessons, teaching strategies, as well as test objectives and items with local and/or state curriculums (Komoski 1987).



Now that curricular correlations of educational videos are available, schools can collect excellent resources that go far beyond textbooks.



If you're interested in the correlations, write to Michelle Ward, PBS Elementary/Secondary Service, 1320 Braddock Pl., Alexandria, VA 22314.

Fig. 2. Comparison of Curriculum Goals/Objective with Textbook Coverage

	2nd Grade	4th Grade	6th Grade	8th Grade
Number of goals/objectives in the school's curriculum (mathematics)	42	52	80	52
Number of goals/objectives covered by the textbooks	40	49	72	36
Percentage of goals/objectives covered in the textbooks	95%	94%	90%	69%
Total number of lessons in the textbooks	170	181	175	105
Textbook lessons that address the goals/objectives	121	80	86	59
Textbook lessons that do not address the goals/objectives	49	101	89	46
Percentage of textbook lessons that address the goals/objectives	70%	44%	49%	56%
Percentage of textbook lessons that do not address the goals/objectives	30%	56%	51%	44%

*Findings derived from a curriculum analysis study carried out for a local school district by the Genesee Intermediate School District, Flint, Michigan, using EPIE Institute's Integrated Instructional Information Resource (IIIR).

Since 1986, school districts and state agencies have used the IIIR to analyze and align curriculums at the macro-level (i.e., producing data of the sort displayed in fig. 2). During 1988 EPIE Institute began using IIIR to provide schools with useful micro-level information that enables teachers (1) to make more effective, selective use of textbook content, until such time as customized textbooks become a reality; and (2) to make more integrated use of nontextbook materials and learning experiences within their school's curriculum.

This information is being provided to schools with the help of a growing network of cooperating regional educational service agencies that are using IIIR to carry out curriculum analysis services for local schools. The nationwide network of service agencies is being developed with support from the John D. and Catherine T. MacArthur Foundation and regional foundations interested in fostering a whole-curriculum approach to teaching, learning, and assessment in schools across the country.

Currently, selected network service centers are piloting the use of IIIR to help schools move from a traditional textbook-based to a whole-language-based curriculum. Another aspect of IIIR's development will help teachers

design curriculum-referenced testing and individualized learning experiences and assessment strategies.

In the area of individualized assessment, one of the most intriguing efforts is being undertaken by the Educational Testing Service (Lipson and Martinez 1989). Based on the concept of "assessment in the service of learning," the effort is committed to developing the role of assessment in serving teaching and learning rather than policing them. The core of the process is a system of self-scheduled, computer-administered testing, which the student uses both to diagnose and to assess progress. Its major potential comes from the developer's commitment to enable individual students to continuously track, assess, and monitor their progress toward complete mastery of any particular aspect of curriculum selected for study. The effect of this enterprise in redefining the role of assessment may be impressive indeed.

A Seamless Enterprise

In far too many schools today, the fabric of curriculum is either badly torn, "made of whole cloth," or bound between the covers of a textbook. However, as efforts of the sort described here are sustained and emulated, they can provide schools with both the tools and the confidence

needed to weave teaching, learning, and assessment into the seamless enterprise these interdependent activities are meant to be. □

¹The efforts mentioned here are meant to be representative of other such efforts of which I am not aware. My hope, however, is that when reading about the efforts described here, those involved in all such efforts will (1) recognize their own work as part of a growing and positive realignment of curriculum thinking and doing; and (2) realize that, as such, they are part of something that is greater than the sum of the "some" that I mention.

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