In the current era of standards-based reform, educators have a unique opportunity to become active participants in improving teaching and learning. The last decade in the United States has seen every state but Iowa develop standards that define academic learning goals for K–12 students. However, educators have learned that having standards is not enough to ensure improved student achievement. Unless teachers can translate the standards into actual classroom practice in terms of what and how they teach and how they assess student mastery, standards will have no effect on student learning. Research shows that "many schools lack an understanding of the changes needed [to achieve standards-based reform] and lack the capacity to make them" (Elmore & Rothman, 1999, p. 5). On the other hand, many teachers and schools are using creative and effective strategies to increase student engagement and learning. These educators should record and share such practices with others who may be having difficulty helping all students achieve high standards.

School districts striving to help teachers and administrators build the capacity to strengthen instruction should involve them in creating an overarching K–12 curriculum that aligns the written, taught, and tested curricula. It is particularly important for school districts looking to align their curriculum with standards to have a document that accurately describes all that is taught. A curriculum map serves this purpose by identifying the actual taught curriculum and allowing teachers to compare their curriculum with that of others who teach the same grade or subject, to view curriculum content longitudinally, and, ultimately, to compare their curriculum with state or national standards. For this reason, curriculum mapping has attracted wide interest as a tool for establishing congruence between what is taught in the classroom and what is expected in state or national standards and assessments.

**Definition**

How is curriculum mapping different from lesson planning? Lesson plans describe in detail what and how a teacher intends to teach on a day-to-day basis—the sequence of activities, student grouping, and resources used. On the other hand, curriculum mapping is a process for recording what content and skills are actually taught in a classroom, school, or district during a longer period of time. The data provide an overview, rather than a daily classroom perspective, of what is actually happening over the course of the school year (Jacobs, 1997a). Curriculum mapping can serve as both an instrument and a procedure for determining what the curriculum is and monitoring the planned curriculum (O'Malley, 1982).

In early work with curriculum mapping, teachers focused primarily on recording the what of teaching (curricular topics) and the when (actual time on task, scope, and sequence of instruction). For example, Fenwick English (1980), a pioneer of curriculum mapping, defined curriculum mapping as a description of the content taught and the amount of time spent teaching it. This view of curriculum mapping evolved from the concepts that the quantity of instructional time affects student achievement and that curricular decisions should be based on accurate information, not opinions (Clough, James, & Witcher, 1996). Curriculum mapping was broadened and deepened in the 1990s largely through the work of Heidi Hayes Jacobs.
Using the calendar as an organizer, teachers describe or "map" a year's curriculum in monthly or grading period "chunks" as it is actually taught. The resulting document is a chart or map of the content, skills, and assessments that describe learning in a classroom. Posting composites of maps in a school or district office affords both a vertical (grade-to-grade, K–12) and a horizontal (all courses within a grade) view of curriculum, instruction, and assessment (Jacobs, 1997a).

The Teaching/Learning Mapping Strategy (TLMS) process developed at the Appalachia Educational Laboratory, Inc. (AEL) extends the definition to include the how of teaching because AEL experts strongly believe that the quality of a learning task is as important as the quantity of time allocated to it. TLMS has a districtwide focus and includes curriculum mapping, alignment, design, and implementation. The process is both a vertical and a horizontal one that removes unnecessary curricular repetitions, promotes alignment, emphasizes cross-disciplinary connections, and encourages "spiraling" of essential skills, which involves reinforcing and extending those skills with increasing complexity within and across grades.

Horizontal alignment occurs as teachers work in grade-level groups to map the content of the taught curriculum and identify the standards they are addressing in each instructional segment or unit. Furthermore, the teachers describe learning activities that illustrate how they teach and explain how they assess students' mastery of standards. This accentuates each teacher's creativity and innovation and promotes the sharing of excellent instructional strategies and effective resources.

TLMS is designed to facilitate teacher collaboration, curriculum alignment, and interdisciplinary instruction. Teachers work across grades and schools to promote vertical alignment K–12 in each content area of the district's curriculum. The strategy supports mapping of all content simultaneously, thus enabling teachers of all grades to identify potential areas for integrating and reinforcing learning across the curriculum.

The professional development component of TLMS includes team meetings and focused workshops. Team meetings of grade-level or subject-area teachers provide time for mapping leaders to support and encourage the mapping process and to facilitate communication throughout the school. The meetings also give teachers time to discuss instruction and student learning and reflect on teaching practices. Teachers develop shared goals for student learning and collaborate to promote student achievement.

Focused workshops, conducted three or four times each year by district and school mapping leaders or consultants, clarify curriculum mapping and provide information and resources to improve alignment and instructional design. As teachers record the taught curriculum, many express a need for expanded teaching strategies and new approaches to student assessment. Focused workshops are designed to address these identified needs. AEL offers training, technical assistance, and resources to assist mapping leaders with designing and facilitating all components of the TLMS process.

The TLMS process enables districts and schools to attain five goals: (1) align curriculum, instruction, and assessment with state or national standards and assessments, (2) enrich instructional practice, (3) increase understanding of results-oriented teaching, (4) improve teacher communication and collaboration, and (5) increase student achievement.
Although individual teachers and schools may benefit from curriculum mapping, administrators should be concerned with curriculum development throughout the entire school system. Hoyle, English, and Steffy (1994, p. 84) offer four reasons a systematic approach to curriculum development is essential:

1. To ensure continuity of instruction within a school and among schools.
2. To ensure progressive skill development among schools through continuity of instruction.
3. To maximize the use of student time, avoid unnecessary instructional overlaps, prevents gaps, and thereby minimize boredom and ensure mastery of curriculum.
4. To provide a strong barrier against the problem of concentrating on one school or level of schools at the expense of the total system.

Although individual teachers may complete curriculum maps during the initial stage of the process, mapping the district’s curriculum is a collaborative endeavor within and across schools and cannot be done in isolation. Once the picture of K–12 teaching and learning is complete, it reveals examples of instructional excellence and innovation. It also indicates areas that must improve for students to achieve higher standards. This information can be useful to instructional supervisors, principals, and teachers in identifying areas of strength within the system, assessing professional growth needs, and developing and articulating curriculum.

**Evolution of Curriculum Mapping**

Curriculum mapping was pioneered in the late 1970s and early 1980s by Fenwick English, a curriculum leader and theoretician. Early maps revealed what topics or skills were taught, in what order, and for what period of time. Coordinators or evaluators used surveys and interviews to determine how much time teachers spent on topics to promote alignment with the adopted curriculum and the assessment program. Because the data collection process went through a third party, there was often a delay in compiling and analyzing the information, sharing findings with teachers, and asking teachers to make adjustments or revisions in subject matter content, the sequence of that content, or the amount of instructional time devoted to that content (Hoyle et al., 1994; Jacobs, 1997a).

Data processing brought curriculum mapping into the computer era. Using the "time on task" approach to curriculum mapping, teachers record on a map or log the time (in minutes or periods) they actually allocate to a subject, topic, skill, or behavior. This way, mapping may be completed weekly, quarterly, or yearly. At the end of each mapping period, data entry specialists or teachers enter all mapping data into a data-processing program that produces individual teacher reports and composite reports illustrating topics taught and time spent on them across grade, school, and district. The weekly or quarterly reports then provide administrators with feedback about the instructional program, which allows them to work with teachers to identify instructional trends and to modify educational programs during the course of mapping. Administrators can then produce year-end and cumulative reports to analyze and chart data that will help them make decisions about curriculum development and modification (Weinstein, 1986).

Today the availability of both personal computers in classrooms and software designed specifically for curriculum mapping make it possible for teachers to develop, archive, search, and print
curriculum maps that include extended information about teaching and learning. The ability to create, search, and sort information about what, when, and how teachers are teaching and assessing learning promotes collaboration, peer reflection and learning, horizontal and vertical alignment, spiraling of instruction, cross-curricular connections, and learning reinforcement. With such electronic tools, administrators also find it easier to monitor instruction and facilitate instructional alignment.

The Curriculum Creator, developed at AEL, is one example of an electronic tool that supports curriculum mapping. The Curriculum Creator is a Web-based tool available to districts and schools by subscription that they can access from any computer with an Internet connection. AEL assigns individual passwords for each staff member.

To emphasize the idea of aligning instruction with standards, the Curriculum Creator requires teachers to link each activity to one or more standards that they may select from multiple content areas. A database stores the standards for each state or province and updates them as they change. The program also includes a function that allows teachers to create and add activities to the unit in random order before putting them in an instructional sequence. The Curriculum Creator then creates curriculum maps for each month or grading period by linking and sequencing one or more instructional units.

By giving teachers the opportunity to print curriculum maps by subject, grade, or standard, the Curriculum Creator's print function eases preparation of district- and state-level reports and facilitates map review within and across schools. In this way, the program greatly aids the mapping process and helps identify and assess areas that may require further attention. (For a complete listing of computer programs that support curriculum mapping, see the Curriculum Resources section of this chapter, p. 57.)

**Context and Purpose**

In the context of the standards movement, curriculum mapping has become a powerful tool for accomplishing both curriculum alignment and curriculum-focused school improvement. In 1983, the National Commission on Excellence in Education issued A Nation at Risk, its report on educational performance in the United States. The report indicated that schools in some European and Asian countries were doing better in both quality and equality of learning, while schools in the United States were losing ground on each count. The report recommended strengthening the content of the core curriculum and raising expectations using measurable standards.

In 1989, the National Council of Teachers of Mathematics led the way with the publication of its standards. Shortly after, the President and governors met at an educational summit in Charlottesville, Virginia, which led to development of the National Educational Goals. The emphasis on promoting educational excellence continued, as an initiative was launched to create national standards in each of the core subject areas. By 2000, every state but Iowa had developed standards in at least the core content areas, and many also had developed assessment systems to measure student acquisition of the concepts and skills outlined in the states' curriculum frameworks (i.e., content and performance standards).
Determining the strategies states used to help students meet high standards was the topic of a research project undertaken by the nation's 10 regional educational laboratories, funded by the U.S. Department of Education's Office of Educational Research and Improvement. Key findings of this study indicated that four primary activities facilitate standards-based reform efforts at the district level (Laboratory Network Program, 1998):

- Aligning curricula to standards and, when possible, to assessments.
- Building staff capacity.
- Developing relationships and communicating with stakeholders.
- Using resources effectively.

Curriculum mapping supports all four of these activities.

**Aligning Curricula to Standards and Assessments**

How well a school system works depends, in large part, on how well it aligns curriculum and assessment with standards throughout the district. In practical terms, this means that for students to succeed, they should be taught what they are expected to learn and assessed on what they are taught.

One way to expedite the alignment process is to build on the curriculum that is already in place. However, defining the specific curriculum is not always easy because the written curriculum outlined in curriculum guides often is not what is being taught in classrooms. Curriculum guides define what *should* be taught, but in many cases they do not affect what actually happens in classrooms. Jacobs (1997b) describes curriculum guides as usually "well-intended fictions." She concludes that curriculum guides may actually encourage teachers to teach what they like to teach. Individual teacher decisions about what to emphasize, made in isolation and with good intentions, can actually contribute to a school's poor test scores.

Another problem with most curriculum guides is that they do not address instruction (how educators teach) or assessment (how educators know students have learned) (Burns, 2001). Research shows that alignment of curriculum topics is not enough; teachers must change their instructional practice if student achievement is to improve (Elmore & Rothman, 1999).

Using curriculum mapping, teachers define the curriculum and review it to identify strong examples of standards-based instruction. They also identify where gaps exist in the standards addressed, deal with repetitions in instruction, and determine the appropriate sequencing and spiraling of concepts and skills. As teachers analyze maps within and across grades, they share examples of creative teaching strategies, fill the gaps in standards-based instruction, eliminate any unnecessary repetitions, and make other adjustments in instruction and classroom assessment to bring the curriculum into alignment with district benchmarks and state standards. Curriculum mapping is not a deficit model of curricular improvement; instead, it builds on the good things that teachers are already doing in the classroom.

If district benchmarks for standards do not exist, a committee of teachers and curriculum specialists should develop grade-level content benchmarks for each standard. This process, called *unpacking the standards*, provides teachers with clearer targets for developing standards-based curriculum,
instruction, and assessment. Once teachers have mapped the taught curriculum, analyzed its alignment to benchmarks and standards, identified examples of instructional excellence and equity, and made any necessary modifications, they are ready to develop exit assessments (traditional and performance-based) for measuring student mastery of the aligned curriculum. Student performance on teacher-developed exit assessments should be an indicator of students' performance on standardized tests. Results also should be used to inform instructional decision making.

**Building Staff Capacity**

Curriculum mapping can also build staff capacity for continuous improvement. In fact, when done systematically, curriculum mapping is in itself a comprehensive professional development program (Burns, 2001). In addition to the previously described alignment activities used during curriculum mapping, a number of scaffolding resources are provided in this chapter that help teachers identify strengths and innovations in their curriculum and locate any areas that need improvement. One such resource is Bloom's cognitive taxonomy (Bloom & Krathwohl, 1984), which is used as a tool for examining the level of thinking required to master specific standards. Many teachers are surprised to learn that the language of standards and the level of questioning on standardized tests is higher than they might have thought; some also find that as they review their maps, many activities and assessments tend to fall in the lower levels of the taxonomy.

Another resource that assists teachers with extending effective and equitable instructional practice is Howard Gardner's *Theory of Multiple Intelligences* (1993). Building on his theory, teachers use surveys and observations to determine their students' intelligences and then design a variety of instructional activities to meet their diverse learning strengths. Because teachers also assess their own intelligences through this process, they are able to build on their individual strengths and promote teamwork within a grade-level or interdisciplinary team.

As teachers analyze their maps and discuss the effectiveness of teaching activities to improve student performance within and across schools, they experience real professional growth. Teachers learn from one another as they design lessons and assessments that are matched to standards. They also differentiate the curriculum. Experts like Jacobs (1997a) encourage teachers to identify potential areas for curriculum integration and provide them with a template for designing rich, rigorous, and relevant standards-based integrated units. Through curriculum mapping, professional development is directly linked to daily classroom practice.

**Developing Relationships and Communicating with Stakeholders**

Curriculum maps are useful visual tools for communicating with parents and students about what happens in a classroom, school, or district. When parents move into a new school district, they may want to learn more about the curriculum that is offered. When individual teachers or teaching teams share curriculum maps with parents, they keep parents informed about their expectations for student work. Seeing the curriculum for a month or for a grading period provides parents with an opportunity to ask questions of the teacher and to assist their children at home. Some parents may even be able to offer resources or special expertise that can contribute to the topics their children are studying.
Students also benefit from seeing curriculum maps. Maps help them become better informed about what is expected of them in the classroom. Students also learn to take more responsibility for their work when they know in advance what will be required. Curriculum maps can help to stimulate students' curiosity and activate their prior knowledge as they begin thinking about what they will learn over the next few weeks.

Many school and district administrators use curriculum maps for documentation and verification of standards-based instruction for the state department of education. For example, Lunenburg County and Galax City school districts in Virginia use curriculum maps to document that the Standards of Learning (SOLs) are being taught in every classroom and in every school. (This is a policy requirement for school accreditation in the state.) Nancy Chappell, director of instruction in Lunenburg County, explains that under Virginia Standards of Accreditation, schools accredited with warnings as a result of low scores on state tests must undergo a state review visit. One of the four questions in this review is "Do you have an aligned curriculum?" Curriculum maps provide documentation for aligning the SOLs at both the school and classroom levels. Furthermore, Lunenburg's participation in the Teaching/Learning Mapping Strategy satisfied Virginia's Standards of Quality requirements: (1) K–12 curriculum aligned with SOLs, (2) division and school-based professional development, (3) data analysis for principals and teachers, and (4) teacher training on test development and assessment.

Using Resources Effectively

"While reviewing their maps, educators also should consider ways to upgrade their teaching strategies and materials" (Jacobs, 2000, p. 2). As teachers analyze their maps and compare their instruction with student performance data, they may identify ways to use instructional strategies and resources more effectively. Sometimes this means that a resource or strategy that is successful for one teacher may be adopted or adapted by others who identify similar needs in their classroom. Likewise, teachers abandon resources and strategies that are not effective in improving student learning.

Conclusion

Curriculum mapping provides a process by which educators can become active participants in improving teaching and learning. Because curriculum mapping builds on teachers' strengths and creativity and focuses on students' learning strengths, it is a teacher-owned and student-centered process. When teachers record their students' actual learning experiences, teachers "own" the curriculum and, therefore, have a greater investment in implementing and sustaining improvements (Burns, 2001).

Curriculum mapping also encourages student creativity. Because the maps show students what they will study, students are motivated to think about questions they may have about the topics or ideas for projects they may wish to pursue. Many teachers engage students in developing essential questions for each instructional unit. Also, teachers frequently design a range of learning activities and assessments that provide choices for students and allow them to use their unique talents and interests.
Because curriculum mapping supports the primary activities that facilitate standards-based reform, and because it is a tool that builds on teacher and student strengths and creativity, curriculum mapping may be the most effective process for improving education. Many reforms have come and gone over the decades without achieving their desired goals. Their failures have been due largely to lack of adoption or sustainability because they were "handed down" to teachers. Curriculum mapping begins with what teachers are already doing well; it is a grassroots process that builds on what is effective and innovative, and it provides opportunities for critical review of instructional effectiveness by keeping the focus on student learning results.

In this age of accountability, curriculum mapping can help districts, schools, teachers, and students achieve their goals. Because curriculum mapping provides a comprehensive professional development tool for using data in instructional decision making, aligning curriculum, determining instruction, assessing with standards, and designing innovative and engaging classroom instruction, it is a powerful tool that can transform low-performing schools into high-performing learning communities. Also, because it is not a "silver bullet" like so many reforms that have failed, curriculum mapping may well hold the future for real and sustainable reform.

Works Cited