



## Filling the Crack in the Middle: A Research Summary

**M**iddle grade students are at a crossroad—emotionally, physically, academically, and socially. Today’s middle schools need caring, competent teachers who understand the unique needs of young adolescents and who establish a safe, nurturing learning environment. Further, teachers of the middle grades must expect all students to achieve a high level of learning and performance. This chapter draws on current research to explain why the middle grades are so important, discusses the link between student achievement and teacher learning, and describes the challenges of establishing this link.

### Beginning in the Middle

**M**iddle school is a crucial turning point in the education of a student. According to the Carnegie Corporation (1989), for many 10- to 15-year-old youths, early adolescence offers the opportunity to choose a path toward a productive and fulfilling life. For many others, it represents their last best chance to avoid a diminished future.

The challenges of educating early adolescents require caring, knowledgeable teachers who balance standards of academic excellence with the need for a nurturing environment. Middle-level students, those in grades five through eight, often fall through the cracks of the education system. Too often, educators and parents alike believe that middle-grade students cannot achieve rigorous academic standards while their bodies are growing and changing physically and while they are plagued by social and emotional problems associated with early adolescence. Yet, schools *can* make a difference for middle-grade students. These are schools that set high expectations, establish a coherent and systematic curriculum, use innovative instructional strategies in which teachers design learning experiences in a complex environment for heterogeneous groups, and engage students in peer-assisted learning (Joyce, 1995).

The middle grades are a significant transition time for students. Middle-grade students begin the inevitable journey of forming lifelong habits of mind which eventually contribute to their academic, social, emotional, and economic well-being as adults. Parents traditionally are less actively involved in the education of middle school students than they were as parents of elementary students. As students become more independent and have less supervision from parents and guardians, they rely less and less on those influences and more and more on the influences of their peers.



Nationally, middle-grade students tend to do less well academically than they did in elementary school. Inequities between high-achieving and low-achieving students deepen during the middle grades with detrimental consequences for those students who continue on the low-achieving track. To combat these problems, every middle-grade school should provide high standards, excellent teachers, challenging curriculum, and a safe and nurturing environment in which young adolescents can form positive, healthy attitudes.

The urgency of middle school reform is highlighted by the research on early adolescence. First, today's students present far greater challenges to classroom teachers than students of even a decade ago. A greater percentage of students who are at risk fill classrooms across the nation. Middle-grade teachers report that today's middle-grade students bring problems to school that previously were more typical of high school students. National survey results indicate that more middle-grade students are sexually active and have experimented with or are regular users of illegal substances (National Center for Educational Statistics, 1997). In addition, more middle-grade students have inadequate support or care from the traditional family, live in poverty, are victims of abuse, have been diagnosed with emotional or learning disabilities, and resort to violence to solve conflict. By age 15, substantial numbers of young teens are at risk for reaching adulthood unprepared to meet the requirements of the workplace, the commitments of relationships with family members and with friends, and the responsibilities of participation in a democratic society (Carnegie Corporation, 1989). Studies indicate that the dropout rates of urban middle school students climb steeply once they leave middle school (*This We Believe*, 1995). These social factors, combined with the natural emotional and physical changes of middle-grade students, pose difficult problems for educators of early adolescents.

In addition to the social and emotional challenges of middle-grade students, the academic challenges of the middle grades are increasing. A review of recent national and international performance of students in the middle grades reveals declining performance between fourth and eighth grades:

- Only 29 percent of the eighth-graders participating in the 1994 National Assessment of Education Progress scored at the proficient level in reading.
- The 1996 National Assessment of Education Progress for writing shows no significant difference in performance between the average scores for eighth-graders and their counterparts in 1984.
- The 1996 National Assessment of Education Progress demonstrates that white students outperform African American and Hispanic students in all areas. The magnitude of the gap between Hispanic students and white students in science, reading, and mathematics is increasing.

- The 1996 National Assessment of Education Progress indicates that the gap between male and female students in mathematics and science has increased as males outperform their female peers. This gap is reversed in reading and writing.
- The 1996 National Assessment of Education Progress for science shows no significant difference in average scores from those attained in 1970 by 13-year olds, while the scores for 17-year olds have an overall negative trend, and the 1996 average scores are lower than the 1969 scores.
- Thirteen-year-old students (eighth grade in writing) attending non-public schools outperformed their peers in public schools in all areas according to the 1996 National Assessment of Education Progress.
- U.S. eighth-grade students scored below the international average of the 41 countries participating in the 1995 Third International Mathematics and Science Study (TIMSS) despite the fact that they spend more time in mathematics and science classes than their international counterparts.

In addition to student performance data, information about middle-grade curriculum, teacher support, and attention to reform efforts contributes to a disappointing view of middle-level education.

- The content taught in a mathematics class in eighth grade in the U.S. is comparable to the content taught in seventh-grade classes in other countries, according to the findings of TIMSS.
- TIMSS indicated that the content of U.S. eighth-grade mathematics classes is not as challenging as that of other countries, and topic coverage is not as focused.
- Most mathematics teachers in the U.S. at eighth grade do not receive as much practical training and daily support as their counterparts in countries such as Japan and Germany, according to the TIMSS findings.
- Most eighth-grade mathematics teachers report familiarity with reform recommendations, yet only a few apply them in their classrooms. These reform recommendations are applied more consistently in Japan, the third highest ranking country in the 1995 TIMSS.

U.S. fourth-grade students are outperforming their international peers in every one of the 41 TIMSS countries except South Korea. Nine-year olds taking the National Assessment of Educational Progress are increasing their performance in science and mathematics. Yet, performance for 13-year olds declines dramatically. These downward trends underscore the urgency to reexamine instruction, curriculum, and staff development at the middle grades.



Together these data highlight the need for strengthening education for middle-level students. These results suggest that students need a more rigorous curricular program, teachers need more support and practical training in content knowledge and instruction, and classroom practices must be more consistent with reform recommendations.

Three additional factors complicate the effort to improve middle schools. *Turning Points*, a 1989 report from the Carnegie Corporation, reports that many teachers of middle school students dislike their work. "Assignment to middle school is, all too frequently, the last choice of teachers who are prepared for elementary and secondary education. Teachers view duty in the middle grades as a way station" (p. 61). Goodlad's *A Place Called School* (1974) cited career disenchantment among teachers in middle grades. Junior high school teachers were less satisfied with their careers than their colleagues in elementary or high schools (Lipsitz, 1984; Carr, 1989; and Scales, 1994).

Few teachers have the specialized preparation to teach in the middle. Since the U.S. middle school movement is fairly new, most teachers who teach in middle school were prepared either for elementary or secondary schools. Those who were prepared for secondary schools focused primarily on high-school-aged students. Yet, understanding the social, emotional, and cognitive needs of middle-grade students requires specialized study in early adolescent development.

Another factor influencing middle school reform efforts is the number of middle school teachers, particularly in math, science, and social studies, who are teaching out of their areas of preparation. The National Center for Education Statistics (1997) reports that nearly one-fourth of all secondary teachers do not even have a minor in their main teaching field. This is true for more than 30 percent of mathematics teachers and 17 percent of science teachers (Darling-Hammond & Ball, 1997). According to a report in *NEA Today* (September, 1997), over one-third of America's secondary math classes, which include both middle, junior, and senior high school, are taught by teachers who have neither a major nor a minor in math. This number almost doubles for social studies classes. And the number of teachers teaching out-of-field classes is significantly higher in lower-track classes, high poverty schools, and high minority schools (National Center for Education Statistics, 1997).

Intervening in the middle makes sense. Commenting to the National Advisory Panel for Results-Based Staff Development for the Middle Grades in 1997, Hayes Mizell, Director of Programs for Student Achievement at the Edna McConnell Clark Foundation, summarized the need to focus on the middle grades:

If all students in the middle are going to achieve at significantly higher levels, they will have to participate in very different and more effective educational experiences than is now the case. . . .

The middle grades are a significant transition time for students. The majority of sixth-, seventh-, and eighth-graders continue to attend regular public schools. Most of these schools have yet to demonstrate that they can provide the very different and more effective educational experiences that enable all students to perform at higher levels. Most schools have neither the content nor performance standards to enable students to perform at higher levels.

Most of these schools have curricula a mile wide and an inch deep. Most of these schools do not have syllabi or a coherent scope and sequence of subject content. Most teachers do not use rubrics that clearly define what constitutes quality student work. Many teachers, especially in math and science, are teaching outside their field of pre-service specialization.

## The Role of Staff Development in the Middle Grades

Research has confirmed what educators have known all along (National Commission on Teaching and America's Future, 1996). The better the teacher, the more successful the student. For decades the U.S. educational system has tried to improve student achievement through tinkering with "the great machinery of education." New management schemes, curriculum packages, testing policies, centralized initiatives, decentralized initiatives, new regulations, elimination of regulations, and special programs had little or no effect on student success (Darling-Hammond & Ball, 1997). What occurs each day in every classroom between teacher and student matters most. Distal factors (those furthest from classrooms) such as school management or district policy are not as significant to student achievement as proximal factors (those closest to students). Educators have known and are beginning to document that the knowledge, skills, and commitment of those who work most closely with students each day make the greatest difference in their achievement.

Darling-Hammond & Ball (1997) report on several studies that conclude that teacher expertise is the most important factor in determining student achievement. Forty-two percent of the variation in student achievement is explained by teacher qualifications. This is almost double the next closest factors of the level of parents' education, which accounted for 24 percent, and other background factors such as poverty, language, and family characteristics, which accounted for 26 percent. Size of school and classes accounted for 10 percent (Ferguson, 1991; Greenwald, Hedges & Laine, 1996). In a similar study in New York, a group of researchers attributed 90 percent of the variation in student achievement to differences in teacher qualifications (Armour-Thomas, Clay, Domanico, Bruno & Allen, 1989).

What constitutes teacher effectiveness is the teacher's content knowledge, understanding of the learning process and child development, and pedagogical skills



(Shulman, 1987). Druva & Anderson (1983) found that science teachers' effectiveness depends on two factors: the amount of discipline-specific training included in the pre-service preparation program and the quality of the staff development opportunities teachers experienced later in their careers. Hawk, Coble & Swanson (1985) found that teachers who had solid preparation in mathematics methods, curriculum, and teaching had students who performed better than those who were teaching out of their license or certification area or who were uncertified or not licensed to teach.

Staff development is an essential ingredient in student achievement. Ongoing development of teachers' knowledge and skills does matter (National Commission on Teaching and America's Future, 1996). Shulman (1987) suggests that teachers need three critical areas of knowledge. First, they need content knowledge—a deep understanding of their disciplines, typical of advanced study of the discipline. Second, they need pedagogical knowledge — knowledge about how to teach. And third, they need pedagogical-content knowledge — knowledge of subject-specific teaching strategies.

The dramatic changes in student population, public demands for reform in schools, expectations for increased student performance on tests and other forms of assessment, and achievement of rigorous content standards establish an overwhelming need for ongoing professional development. In addition, recent research on how the brain functions and how learning occurs at various stages of human development challenges many current assumptions about teaching and learning. These new findings produce a sense of urgency for “the creation of a staff development system that affects student learning” and “requires the coordination of the renewal of individual practitioners, school faculties, the district, and governing agencies” (Sparks, 1995, p. 1).

To face the complexities of educating middle-level students, teachers must engage in staff development that increases their knowledge and skills, challenges their beliefs and assumptions about education, provides support and coaching to develop comfort with new practices, and engages them as active participants in the study and reform of the school culture. Schools and districts have an obligation to provide a staff development program that engages education professionals in continuous renewal to ensure that all students receive the best possible education regardless of their race, ethnicity, gender, handicapping condition, family circumstance, where they live, level of income, or any other factor. Educators cannot afford to squander the future of middle school students.

Teachers who are lifelong learners are more likely to adapt to the growing demands and challenges of educating middle-grade students. Teachers who continue to extend their content knowledge and instructional strategies are better equipped to accommodate the diverse needs of middle grade learners. Teachers and other staff who collaborate with their peers in conducting research, sharing ideas, planning together, and analyzing student work are able to solve the problems they face in educating young adolescents.

Ashton & Webb (1986) concluded that collaboration among middle-level teachers reduces teachers' sense of powerlessness and increases their sense of efficacy. In a comparative analysis of the traditionally organized junior high school and a more progressive middle school with students of similar social backgrounds, students in the middle school achieved higher scores on measures of basic skills. In the traditional junior high school, teachers often identified student motivation or background as the predominant causes for students' poor performance. Teachers exhibited a greater sense of fatalism about student academic potential. In contrast, teachers in the middle school were convinced that they made a contribution to their students' lives and were committed to do so. They held stronger convictions about their role in developing the potential of students and recognized their responsibility for both the personal and the academic development of their students. These results, according to Ashton & Webb, can be attributed to the differences in teachers' sense of certainty and confidence in their contribution to improving student performance.

Particularly effective for middle-grade teachers are learning experiences designed to extend teachers' content knowledge and instructional strategies. Staff development practitioners for the middle grades can apply some strategies identified in research at the elementary level. In a recent survey of elementary mathematics teachers, Cohen & Hill (1997) suggest that "when teachers have significant opportunities to learn the content that students will learn in ways that seem to enable them to learn more about teaching the material — and when assessments are linked to the students' and teachers' curriculum — teachers' opportunities to learn pay off for their students' learning" (p. 61). Generic staff development that is unrelated to specific standards for students has no effect on classroom practice or student achievement (Cohen & Hill, 1997).

Although the Cohen and Hill research was conducted at the elementary school level, if this research study of elementary mathematics teachers holds true for middle-grade teachers as well, it marks a critical turning point for the design of staff development. Since many middle school teachers are teaching out of their area of content expertise and have little specialized preparation for working with early adolescents, staff development for today's middle school teachers must be tied directly to the content standards and the instructional strategies necessary to support student learning. Teachers need more practical knowledge and skills and more frequent and consistent classroom-based support, such as coaching and observation. Teachers also need ongoing opportunities to apply content knowledge and content-specific strategies in their classrooms with their students. This wake-up call for more content-specific staff development has as its single goal improving the achievement of all students.

Joyce & Showers (1995) describe a comprehensive professional development system that puts each educator with another in a coaching team, pairs three coaching teams into a study group of six, and engages whole faculties in the pursuit of school improvement. This comprehensive school-based program design recognizes that: (1) staff development is not a voluntary experience, but rather the expectation for all pro-



professionals; (2) each professional is a valued, contributing member to the total school success; (3) a small number of enthusiastic individuals alone cannot sustain school reform; (4) all professionals have an obligation to contribute to the decisions regarding the design and delivery of professional development; (5) all members of a school community must assume responsibility for students' success; and (6) all professional development is a balance of individual, schoolwide, and districtwide components aligned with a common vision for improving student success.

## **Linking Student Achievement and Staff Development**

According to Mizell (1997), "After decades of staff development experience; after annual expenditures of millions, perhaps billions of dollars for staff development; after many examples of staff development being subjected to the rigors of free enterprise, entrepreneurship, and the free market, what does staff development really amount to? What is there to show for it? If we can't make judgments now about what programs are and are not effective, when will we be able to do so? How much longer must teachers and students wait? How much longer must they struggle along while ineffective staff development is the rule rather than the exception, consuming precious resources and time?"

However, drawing a connection between staff development and student achievement is a daunting venture. Traditional research designs fall short of demonstrating the relationship between staff development and student learning. Educators must be prepared to devote considerable effort and resources to demonstrating the link between teacher learning and student achievement. According to Hein (1997), efforts to connect teacher behavior and student learning are extremely time consuming and costly.

According to Hein (1997), a key to demonstrating the link between staff development and student achievement is to look for evidence of change in teacher behavior and attitudes that result from staff development. Changes in behavior and attitude must be documented in order to establish the connection between student learning and teacher development. In other words, program evaluators must ask: What changes are evident in teachers as a result of the staff development program? How have those changes influenced student learning? This type of research is expensive. Perhaps this explains the virtual absence of research that establishes a relationship between teacher and student learning.

Curriculum reform, improvement in school organization, and increased resources will do little to influence student achievement if the staff working with students is inadequately prepared to face the demands of educating middle school youngsters. Comprehensive staff development incorporates appropriate instructional techniques and learning experiences for teachers and other staff. It adheres to high content stan-

dards. And, it provides sufficient time for learning, practicing, and planning for and debriefing implementation. In addition, staff development that influences changes in teachers' behaviors and beliefs focuses on content consistent with national standards. It demonstrates pedagogy that reflects current research about teaching and learning. It incorporates content-specific knowledge that relates to student experiences and environment. And, it is of sufficient duration to constitute a powerful intervention to alter teachers' behaviors and beliefs, and is part of a long-term, systemwide effort to improve the performance of teachers, schools, and students (National Science Foundation, 1995; Sparks, 1997).

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