

“Teaching is only the art of awakening the natural curiosity of young minds for the purpose of satisfying it afterwards.”

Anatole France, *The Crime of Sylvestre Bonnard*

THE SYSTEM

TEACHER QUALITY

Stories written by and about exemplary teachers are well known.¹ More difficult to find is objective data on how much difference the average teacher can make. What makes for successful teaching? It is a difficult question, with complex and elusive answers—the pursuit of which is necessary and critical.

Do Teachers Make a Difference?

In 1978, three Canadian researchers published a powerful example of the long-term effects of quality teaching. They gathered historical data on first-grade students at an urban elementary school, documenting their academic growth as they progressed through successive grades and studying their successes in life as adults.

They discovered that one group of students not only performed better in each successive grade, but also achieved greater success as adults. The only factor linking those students was that they shared the same first-grade teacher. Judged by their occupation, type of residence, and other socioeconomic factors, students of Miss Apple Daisy² were more successful than students of other first-grade teachers at the same school.³

As adults, the former students of Miss Apple Daisy easily recalled being in her class, while less than half of the other students correctly identified their first-grade teachers. A few even misidentified Miss Apple Daisy as their teacher!

If one teacher can influence the lives of students so dramatically, imagine the results when a student is fortunate enough to have effective teachers over consecutive years. Recent work is beginning to confirm that good teaching compounds rapidly.⁴

What Makes a Good Teacher?

We know, not surprisingly, that what happens during classroom instruction can have remarkably strong effects on student learning.⁵ Recent research findings have uncovered or confirmed teaching methods that make a difference.⁶ Nevertheless, what makes a good teacher remains uncertain. Consider the following:

- A major national review⁷ of teacher quality and its link to student performance found that training and experience matter:
 - Fourth-grade students whose teachers have a college major in mathematics education or education outperform students whose teachers majored in a field other than education. In eighth grade, students of teachers with a major in mathematics outperform students whose teachers majored in education or other subjects.
 - Eighth-grade students whose teachers are certificated in mathematics perform better than eighth-grade students whose teachers are not certified in this area.

- Students who are taught mathematics by teachers with more than five years of teaching experience are more likely to perform better than students taught by teachers with five or fewer years of experience.
- The more knowledge eighth-grade teachers reported of National Council of Teachers of Mathematics (NCTM) standards, the higher their students' mathematics performance tended to be on the National Assessment of Educational Progress (NAEP).
- Effective teachers work differently. They give explanations from multiple perspectives, respond promptly and accurately to student questions, plan lessons systematically and intelligently, qualify assertions appropriately, and choose carefully what they teach and what they do not teach.⁸
- Students whose teachers have good reading skills perform better than students of teachers with lower reading skills.⁹
- Good teachers know *how* to teach. They readily and clearly describe what is important in classroom events, including events others miss. They have a strong clinical sense of what is happening elsewhere in their classrooms, even as they focus on an individual student's learning.¹⁰

Ohio's Teachers

Ohio's math and science teachers bring a wide variety of qualifications and resources to the classroom:

- Their undergraduate and graduate work gives them exposure to college courses in many diverse subjects.
- The typical, certificated Ohio teacher has 14.9 years of experience.¹¹
- Of Ohio's teachers, 48.8 percent hold a Master's degree or higher.¹²
- Ohio's teachers have pursued national board certification actively, resulting in almost 600 nationally certified teachers, more than almost all other U.S. states.¹³

On the other hand, some of the Ohio data raise questions:

- Most states today require teachers to pass examinations on subject-matter knowledge and teaching knowledge. Ohio does not require such testing, although some individual districts do so.¹⁴
- Ohio is one of only 11 states that do not require a written test of basic skills for beginning teachers.¹⁵
- Sixty-one percent of Ohio's secondary teachers hold a degree in the subject they teach, slightly below the national average.¹⁶
- Few of Ohio's math teachers say that the NCTM standards help them choose what and how they teach.¹⁷ On the other hand, these standards, as well as the science standards from the American Association for the Advancement of Science (AAAS), heavily influence Ohio's model curricula and district curriculum guides, which teachers do depend on.
- Ohio's most skilled teachers list professional development as a critical and necessary means to enhance teaching skills.¹⁸ However, research shows that the number of hours of

professional development teachers receive is not related to students' performance in mathematics.¹⁹ The problem may be the content of the professional development opportunities currently available to teachers.²⁰

Routes and Destinations

Clearly, college education, certification, experience, skill, intelligence, and professional development are all important attributes of good teachers. However, some of today's eighth-grade math students in Ohio are being taught mathematics by teachers who did not major in math in college, may not be certified to teach math, have little or no knowledge of NCTM standards, and may not have a great deal of teaching experience.

Why was Miss Apple Daisy able to make such a difference? The comments of her students, decades after being in her class, are pertinent.²¹ She left a "profound impression of the importance of schooling," said one. Another claimed, "She gave extra of herself to students who were slow learners. We all loved her so much, that sometimes we wished we were slow learners, too." A former colleague cited "the sheer force of her personality and her obvious affection for the children." If a student needed a bus ticket, she paid for it. When children forgot their lunches, she gave them her own. "I have a five-year-old son," said another former student, "I only wish I could find an Apple Daisy for him."

If teachers like Miss Apple Daisy are noteworthy because they are the exceptions to the rule, we should not look to create more exceptions, but to find ways to change the rule.

Endnotes

1. The work of Jaime Escalante in Los Angeles was the subject of the 1987 feature film *Stand and Deliver*. Autobiographical descriptions of teachers' work includes S. Ashton-Warner, *Teacher*, Simon & Schuster, New York, NY, 1963; A. S. Neill, *Summerhill*, Hart, New York, NY, 1960; and V. Gussin Paley, *Mollie Is Three: Growing Up in School*, University of Chicago Press, Chicago, IL, 1986. Descriptive reports of teaching also can be found in T. Kidder, *Among Schoolchildren*, Houghton-Mifflin, Boston, MA, 1989; G. McPherson, *Small Town Teacher*, Harvard University Press, Cambridge, MA, 1972; B. Kaufman, *Up the Down Staircase*, Avon, New York, NY, 1964; C. Rathbone, *On the Outside Looking In: A Year in an Inner-City High School*, Atlantic Monthly Press, New York, NY, 1998; and L. Delpit, *Other People's Children: Cultural Conflict in the Classroom*, New Press, New York, NY, 1995. Some descriptions of teaching in Ohio are drawn in the unpublished document *Pathways to System Reform: Case Studies of Ohio Schools*, prepared with funding from a grant from the National Science Foundation to J. Kahle, then of Miami University.
2. Her name was Iole Appugliese (pronounced Yolly Appulyazy). Unable to say this, her first-grade students called her Miss Apple Daisy.
3. E. Pedersen, T. Faucher, and W. Eaton, "A New Perspective on the Effects of First-Grade Teachers on Children's Subsequent Adult Status," *Harvard Educational Review*, 48(1), February 1978, pp. 1-31.
4. The work of William Sanders in Tennessee has most clearly shown the exceptional academic gains children can make when they are taught in successive years by their schools' best teachers: W. Sanders and J. Rivers, "Cumulative and Residual Effects of Teachers on Future Student Academic Achievement," unpublished paper, University of Tennessee (Knoxville), Value-Added Research and Assessment Center, 1996. Similar results have been observed in Dallas: see H. Jordan, R. Mendro, and D. Weerasinge, "Teacher Effects on Longitudinal Student Achievement," paper presented at the Center for Research on Educational Accountability and Teacher Education, Indianapolis, 1997.
5. M. Wang, G. Haertel, and H. Walberg, "Toward a Knowledge Base for School Learning," *Review of Educational Research*, 63(3), Fall 1993, pp. 249-294. Wang and colleagues insist strongly that their research is "inconsistent with current conventional wisdom which argues for policy-driven solutions, like school restructuring, school-site management, and tougher teacher credential requirements and evaluation, to improve student learning."

Endnotes

6. J. Bransford, A. Brown, and R. Cocking (Eds.), *How People Learn: Brain, Mind, Experience, and School*, National Academy Press, Washington, DC, 1999.
7. E. Hawkins and J. Dossey, *School Policies and Practices Affecting Instruction in Mathematics: Findings from the National Assessment of Educational Progress*, National Center for Education Statistics, U.S. Department of Education, Washington, DC, 1998.
8. L. Shulman, "Knowledge and Teaching: Foundations of the New Reform," *Harvard Educational Review*, 57(1), 1987, pp. 1-22.
9. R. Ferguson and H. Ladd, "How and Why Money Matters: An Analysis of Alabama Schools," pp. 265-298, in *Holding Schools Accountable: Performance-Based Reform in Education*, Brookings Institution, Washington, DC, 1996.
10. D. Berliner, "Expertise: The Wonder of Exemplary Performances," pp. 161-186, in J. Mangierie and C. Block (Eds.), *Creating Powerful Thinking in Teachers and Students*, Holt, Rinehart, and Winston, Fort Worth, TX, 1994.
11. State Board of Education of Ohio, *Annual Report 1998-99: Ohio's Schools: Pride in the Past, Confidence in the Future*, Ohio Department of Education, Columbus, OH, 1999.
12. Ibid.
13. See the Web site of the National Board for Professional Teaching Standards (www.nbpts.org/nbpts/).
14. National Center for Education Statistics, *Digest of Educational Statistics 1998*, U.S. Department of Education, Washington, DC, 1999.
15. *Education Week*, "Quality Counts 2000," 19(18), January 2000.
16. National Education Goals Panel, *The National Goals Report: Building a Nation of Learners, 1999*, Washington, DC, 1999.
17. NCREL analysis of OMSC-sponsored teacher survey in Ohio, fall 1999.
18. NCREL-sponsored symposium for exemplary Ohio teachers, Columbus, November 11-12, 1999.
19. Hawkins and Dossey
20. J. Stigler and J. Hiebert, *The Teaching Gap: Best Ideas from the World's Teachers for Improving Education in the Classroom*, The Free Press, New York, NY, 1999.
21. R. Collins, "Miss Apple Daisy," *Reader's Digest* (Canadian edition), September 1976, pp. 142-147.



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