ETS Study Links Effective Teaching Methods to Test-Score Gains

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By Julie Blair

Students whose teachers undertake further study and who use certain instructional strategies score higher on tests than students who don't have the benefit of such teacher practices, a study released last week concludes.

The report aims to answer the question of whether effective teachers do things differently. The answer is a resounding yes, said Harold H. Wenglinsky, the report's author and an associate research scientist at the Educational Testing Service.

But policymakers have largely ignored classroom factors, he says, in favor of focusing on such considerations as teacher recruitment and pay.

"In sum, this study shows not only that teachers matter most, but how they most matter," he writes. "What really matters is not where teachers come from, but what they do in the classroom."

The report, released last week by the Princeton, N.J.-based testmaker, linked teachers' classroom practices, professional-development experiences, and educational backgrounds to the performance of 8th graders on the mathematics and sciences portions of the 1996 National Assessment of Educational Progress.

Mr. Wenglinsky said the study illuminates the paths educators should follow to help their pupils make gains in learning.

Students who performed ahead of their peers were taught by educators who integrated hands-on learning, critical thinking, and frequent teacher-developed assessments into their lessons, he found.

However, he said in an interview, "the kinds of [teaching practices] that do seem to be effective seem to be precisely those that are being discouraged, or at least not pursued in most classrooms in the country."

Hands-On Learning

The study, "How Teaching Matters: Bringing the Classroom Back Into Discussions of Teacher Quality," looked at nearly 15,000 NAEP scores. Using the questionnaires filled out by student test-takers and their teachers and principals, the researcher was able to investigate if what teachers did in their classrooms had an impact on NAEP scores.

Students whose math teachers had employed hands-on learning tested 72 percent ahead of their peers on the assessment, which is given to a sampling of students nationwide. Those whose teachers stressed critical-thinking skills posted scores 39 percent higher.

In science, 8th graders who had completed hands-on learning tasks scored ahead of their other peers by 40 percent.

For both subjects, students whose teachers used frequent in-class tests scored higher than those who used portfolios and projects. But Mr. Wenglinsky said portfolio assessments should not be eliminated, because such methods help track the progress of the entire class.

Unfortunately, the report says, too few teachers use the practices that were associated with higher scores.

Math teachers commonly assign rote work and real-world story problems, it says, but largely ignore writing about math—an important high-order thinking skill. And only a handful of math educators use models or blocks to help students conceptualize problems, it says.

Misguided Classes?

Science teachers engage students more often in hands-on learning experiences and assign more writing than math instructors do, yet only 59 percent complete a science demonstration each week, Mr. Wenglinsky found.

Time that teachers spent outside the classroom had, in some cases, more impact on students than classroom instruction did, the report says.

Students taught by math teachers who had learned to work with students who came from different cultures, had limited proficiency in English, or had special needs tested more than one full grade level above their peers.

Those teachers likely enjoyed success because they had learned how to individualize their instruction, Mr. Wenglinsky said.

Having such teachers did not improve achievement on science tests, however.

But science instructors who had learned laboratory skills appeared able to raise student achievement significantly. Their students scored 44 percent higher than others in the same grade.

Despite those findings, a majority of math and science teachers take professional-development classes on cooperative and interdisciplinary instruction, according to the report—methods that it says had little impact on student achievement.

Teachers' educational backgrounds also appear crucial, the study found. Students whose teachers had college majors or minors in either math or science scored 39 percent higher than those whose teachers lacked such preparation.

That finding made sense to James W. Fraser, the dean of the school of education at Northeastern University in Boston.

"If you are going to engage students in active learning, higher-order thinking, and hands-on experiments, all sorts of questions will be generated, and the teacher needs to be ready," he said. "You need to know your stuff."

The report makes one strong recommendation: Improve teaching through high-quality professional development.

"The first step for policymakers," it argues, "is to stop scratching the surface of teaching and learning through superficial policies that manipulate teacher inputs, and instead roll up their sleeves and dig into the nature of teaching and learning by influencing what occurs in the classroom."

FOLLOW-UP: "How Teaching Matters Bringing the Classroom Back Into Discussions of Teacher Quality" is available from the ETS for $10.50 by calling (609) 734-5694, or online at www.ets.org/research/pic.

Teacher Quality and Student Test Scores

This chart shows how various indicators of teacher quality were related to 8th grade students' performance on the mathematics and science portions of the 1996 National Assessment of Educational Progress. The percentages indicate how far ahead or behind their grade-level peers the students scored.

Aspect of Teacher Quality	Difference In Scores
MATH	
Major/minor in math/math education	39%
Professional development in working with different student populations	107%
Professional development in higher-order thinking skills	40%
Hands-on learning	72%
Higher-order thinking skills	39%
Using portfolios and projects instead of tests	-46%
SCIENCE	
Major/minor in science/science education	39%
Professional development in laboratory skills	44%
Professional development in classroom management	-37%
Hands-on learning	40%
Giving frequent tests	92%

SOURCE "How Teaching Matters Bringing the Classroom Back Into Discussions of Teacher Quality," Educational Testing Service

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