Just fifteen years ago, Vermont’s public schools faced a numbers crisis.

Students in nineteen elementary schools were underperforming in mathematics on state assessments, prompting the state to tap into expertise in academia as it searched for a solution to the daunting problem.

The result? In 1999, the state and educators at the College of Engineering and Mathematical Sciences at UVM banded together to create the Vermont Mathematics Initiative (VMI). The novel effort to strengthen mathematics education across the state was the brainchild of Ken Gross, the University of Vermont Azarius Williams professor of mathematics, and the late state education commissioner Marc Hull.

Together, the pair initially worked with a cohort of elementary and middle school teachers to get the project off the ground. Since then, the program has worked with more than 400 K-12 teachers representing 90 percent of Vermont’s school districts, helping them to develop and reinforce their knowledge and confidence in teaching mathematics concepts. The teachers then take what they’ve learned back to their classrooms, sharing their newfound knowledge with both students and colleagues.

“Elementary school teachers were being asked to teach mathematics they didn’t know,” Gross notes. “VMI changed the paradigm. We treated the teachers as professionals and focused on problem solving. We were the first to place the emphasis on the teacher’s own mathematics knowledge and
let that knowledge drive the pedagogy, but to me it was a no-brainer. It seemed the obvious thing to do."

The proof of the program’s effectiveness can be shown through the outcome for those initial underperforming 19 schools: Within two years of VMI’s existence, every one of those schools was off that list.

Once teachers are armed with what it takes to help their students understand mathematics in foundational ways – not just to buzz through math worksheets in preparation for standardized tests – their students almost immediately perform better on those tests. Formal longitudinal evaluations have shown that the students of VMI-trained teachers consistently outperform students in matched control groups in a statistically significant way.

“There’s a tendency to measure a program’s success by how the teachers’ knowledge improves, but that’s not what you should be measuring. The teachers’ knowledge is a way station on the road toward your ultimate goal, which is the performance of the students of those teachers,” Gross explains. “We help teachers build self-confidence through gaining competence in something difficult that many of them couldn’t do before. That improvement in student performance is a direct result of the teachers’ newfound knowledge and confidence.”

VMI’s success hasn’t gone unnoticed. Eight other states have adopted the initiative’s approach, including Massachusetts, where Gross implemented it while serving as a visiting professor at Lesley University in Cambridge, and Pennsylvania, which created the Pennsylvania Mathematics Initiative.

The effort has also positioned Vermont to take better advantage of the mathematics curriculum reforms demanded by the Common Core, which was adopted by the state in 2010. While Common Core reforms hold both teachers and students accountable for a higher level of competency in mathematics, professional development designed to help teachers implement the new standards has been spotty nationwide – but not in Vermont. Most of the people now leading the state in the Common Core training in mathematics have come through the VMI program, setting Vermont up to meet new federal benchmarks with far less of the hand-wringing going on now in many other states.

In fact, many former VMI students are now statewide leaders in mathematics education in Vermont overall. VMI’s executive director Judi Laird, who will take over for Gross as director as he embarks on a leave of absence in 2014-15, was a member of the first cohort in 1999. So was her brother Bob Laird, as well as Susan Ojala, who form the VMI leadership team along with Gross.

Gross says that he, in fact, has learned a great deal about teaching from the outstanding teachers who have gone through VMI – this from a professor who has won UVM’s highest awards for both teaching and research, who never thought of himself as a teacher of teachers until he and Marc Hull got the VMI project underway.

“If you had told me 15 years ago I was going to be better known for mathematics education than for research, I would have said you were crazy,” he laughs. ◆