



CTL's Origin and Development

Dr. Robert (Bob) Goodman never anticipated that his first quick spin around Bergen Tech to better equip his new classroom would be the first step toward challenging the entire status quo system of STEM education. But it was.

Bob had always loved science. After graduating from MIT, he headed into a career in audio electronics, where he ended up serving as the president and CEO of several well-known brands. He ultimately spearheaded the turnaround of each of them; but after over twenty years in business, Bob took a dramatic step. He returned to his passion for physics, volunteering to teach his first classes at a nearby private school.

He quickly discovered: "Science is easy, Teaching is hard."

Several times during his first year in the classroom, he pulled over to the side of the road on his way home and literally cried with frustration. The combination of trying to motivate his students, control his classroom, create a reliable consistency in his teaching approach, evaluate his students in preparation for end-of-course exams, inspire the class leaders and help the stragglers, and on top of it all, invent a lesson plan from scratch every day, made his previous corporate life look like a cake walk. Productive teaching takes an extraordinary amount of effort; and the first year of teaching is almost universally formidable.

But as with all good teachers, Bob learned.

He learned that all kids respond well to a challenge -- and to the satisfaction of successfully completing a tough problem.

He learned that students work well in small groups, figuring out solutions to increasingly complex problems among themselves after a short lesson from their teacher.

Bob was hooked. He got an MAT in teaching physics and took on his next challenge: a public school teaching job at Bergen County Technical School in Teterboro, New Jersey -- a school with a largely underserved population. His classroom only included computer stations and this didn't reflect the collaborative learning environment he envisioned. So he pilfered round tables from the faculty room, chairs from the cafeteria and a blackboard from a closet. And the stage was set for change.

He had also learned that it was more effective to essentially "reverse" the order of instruction and use physics as a primary building block for mathematics and science



education, rather than positioning it as a rarely studied area of science at the uppermost reaches of high school education.

In response, he developed his own curriculum: the Progressive Science Initiative (PSI®), which eliminated the need for textbooks and provided an easily replicable format to engage the entire classroom.

As a result, his students developed a passion for mathematics and science, getting a personal sense of just how useful these subjects can be. Within a few years, all students in the school were taking physics in the 9th grade and many were heading on to AP courses; making the school #1 in the state for AP Physics.

In 2006, Bob was named New Jersey Teacher of the Year; the same year that the New Jersey Education Association (NJEA) asked him to be a founding board member of the New Jersey Center for Teaching and Learning (CTL). CTL was created by NJEA's president, Joyce Powell, to empower educators to spearhead education reform and position teachers to better prepare their students for the new testing standards. In 2009, Bob became a full-time CTL employee and helped build a smart dedicated team to continuously improve and grow the initiative.

Both New Jersey policy makers and New Jersey teachers supported bringing PSI to more schools.

Whiteboard software and associated student polling devices were introduced to blend the new curriculum, teaching methods and real-time assessment into a seamless whole.

The same collaborative teaching method was used to train teachers of every background to teach science, and CTL quickly became the #1 producer of physics teachers in the U.S., as well as a leading producer of chemistry teachers.

PSI first demonstrated that all students could learn science, and now it proved that teachers from every background could successfully teach science. Most importantly, CTL provided teachers with much-needed support – just the kind of support that would have been so helpful for Bob, especially in his first year.

CTL offers an exciting curriculum with a visually evocative, yet reassuringly consistent format for students; as well as plenty of flexibility for each individual teacher's input. And because the lesson materials are not only created by highly experienced and talented educators, but are also presented to the class on an interactive whiteboard,

CTL empowers teachers to put their energy into the art of teaching. Rather than turning their backs to the class to write on a board, teachers can focus on real-time student interactions, and getting their students genuinely interested in learning.

As with Bob's own classes, the success that both teachers and students often find with CTL can influence their sense of accomplishment and their interest in achieving more.



CTL has applied its learning from its high school science programs, and expanded its reach to include all K-12 science (PSI®) and K-12 mathematics, through the Progressive Mathematics Initiative (PMI®).

Now, in the 15 years since Bob set up his first classroom, Bergen County Technical High School has been ranked the #3 high school in New Jersey and #31 out of over 14,000 high schools nationwide, while earning Newsweek's distinction of "Overcoming the Odds" due to its share of underrepresented minorities and students in poverty.

And the entire initiative is taking off. More than 1,500 certified mathematics and science teachers have been trained to teach PSI and PMI, and this pedagogy is on the ground in 218 schools in the U.S., Argentina and West Africa. This new pool of STEM teachers is atypically racially and gender diverse and they can serve in a role model capacity for their students. In addition, there have been over 1.7 million downloads of CTL curricula files in the last 12 months alone.

As a result, approximately 2.5 million students learned from CTL content in the past year, many from economically disadvantaged backgrounds.

This, however, is just the beginning. CTL's initiatives have grown rapidly, but course materials and the use of technology require consistent improvement as needs change and technologies evolve. Only a small percentage of schools are currently well served in science and mathematics education, and much geographic growth is ahead.

The potential is inspiring. CTL has introduced a groundbreaking new pedagogy to empower teachers to lead the transformation of education. The goal is nothing less than to give all students the opportunity to actively contribute to a powerful future.

