



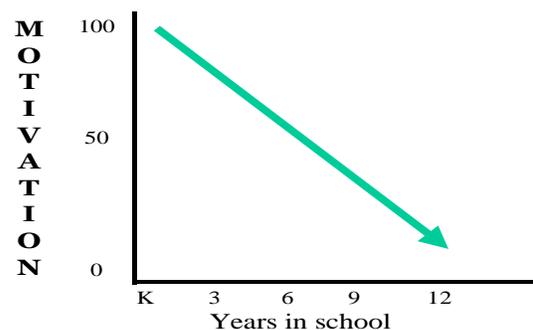
## **Quality in the Classroom: Engagement, STEM and Achievement All in One**

*by Michele Brinn, vice president of workforce development and education, for the Greenville (SC) Chamber of Commerce, and Stephanie Morgan, former teacher and instructional coach*

Picture the United States as a competitive athlete and the rest of the world as the playing field. Science, technology, engineering and math (STEM) careers and education will keep us leading in the innovation market—the driver of economic success. We face many barriers to winning this race. Some examples of these challenges include the “fear” of math and science passed from one generation to the next, lack of knowledge about the need and opportunities available in STEM careers, and minorities and women underrepresented in STEM fields.

Every year that a child spends in school in the United States, he or she loses interest in achieving and intrinsic motivation slowly fades away (see figure below). Educators are well aware of the fact that the results they are working so hard to achieve are just not up to par. W. Edwards Deming taught us that 96% of results such as these can be attributed to the design of the system and only 4% can be blamed on the person (parent, teacher or student).

### **Student Motivation To Learn**



We know that the system isn't working and that a change is needed to engage students and teachers. Buy-in is needed at all education levels to have a system capable of creating highly engaged successful people as technologically advanced

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scientists, mathematicians and citizens in the 21<sup>st</sup> century. Quality professionals know their tools can fix anything—even education.

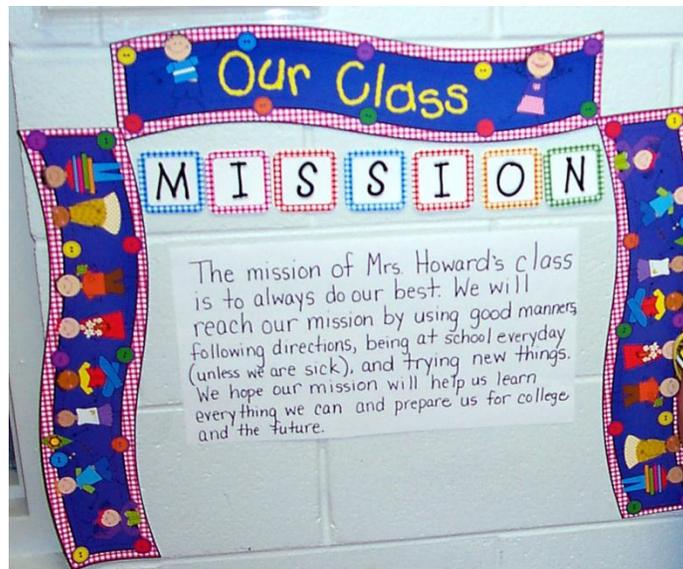
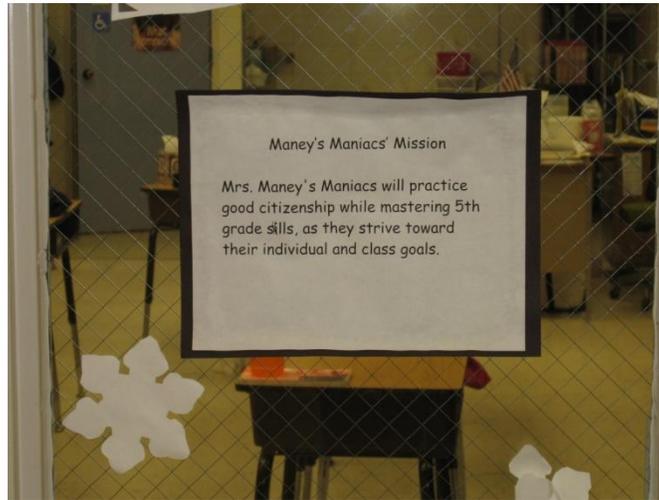
In 2002, the Carolina First Center for Excellence, the premier program of the Greenville Chamber of Commerce Foundation, joined others in this quality in education movement by serving four schools in Greenville, SC. The center now serves almost 50 schools in the Upstate region. Center staff opened the eyes of the community's school leaders to challenges and barriers that cause discouragement and failure.<sup>1</sup> At the same time, continuous quality improvement (CQI) strategies and tools are taught and used for success. This process—a cycle of investigation, implementation and evaluation (the scientific method) at the classroom and individual learning levels—puts a new spin on the old learning framework. By providing educators with appropriate tools and guiding them on usage, the classroom learning environment and behavioral environment grows one mission statement at a time.

Putting CQI tools and strategies into teachers' and students' hands yields improved student engagement, responsibility, problem-solving skills and achievement. A focus on results provides a common language for the community.

The strategies taught to educators are the same as those that people use within their successful organizations. Engineers and scientists are needed, as well as employees in every field who can use mathematic and scientific thought processes to solve problems. Starting in kindergarten, quality in the classroom builds these skills.

### **Some examples**

**Mission statements:** Students work as a group to create their classroom mission statement using tools such as five whys and affinity diagrams. This sets the stage for focus and engagement.



**Student goal setting and data tracking:** Teachers work with students to set attainable goals in all subject areas. Students track progress toward goals in their data folders or notebooks. These folders might include a mission statement, goal statements, subject area test and quiz graphs, reflective statements, behavior graphs, attendance and homework completion. Students take ownership and pride in this tangible evidence of their journey. Data tracking provides the foundation for data-based decision making as a value and a STEM skill. A student who regularly graphs achievement results will not



decline two weeks in a row. This student can be heard saying, “I went down this week, and next week I’ve got to work harder,” while describing specific action steps.

Second graders can and do “drop out” of school. One who receives a 2, 3, 4, 5 and 6 on weekly 10-point quizzes will be handed papers with big Fs. By the fifth week, the student chooses to drop out rather than continue to try and fail. Student graphing overcomes this system failure by allowing the student and teacher to see continuous improvement toward the goal of achieving an 8. Celebrations for achieving an all-time-best are observed each week, keeping the student engaged.

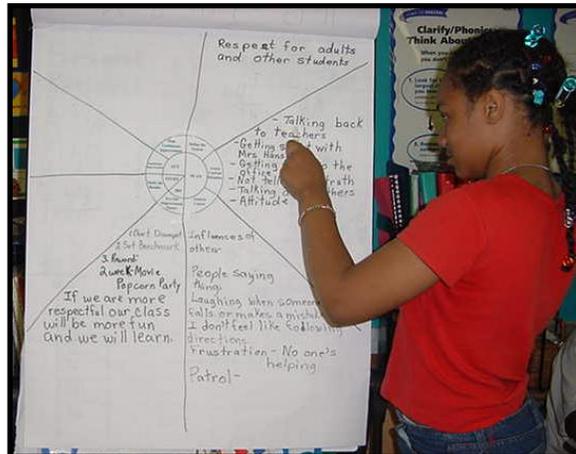
**Classroom and schoolwide results:** On classroom walls and in hallways, libraries, gyms and science labs, graphs depict student achievement. These graphs drive a culture of success and the motivation to work as effective members of a winning team.

**Quality tools and plan-do-study-act (PDSA) cycle:** Much like Six Sigma, CQI is based on the belief that the wrong actions do not create the right results. Teachers and students work together to decide whether or not classroom components are bringing about desired results. The PDSA cycle is used to ensure improvement, not just change. Quality tools are used to gather and organize data, provide a useful and efficient way to gather the voice of the student customer and demonstrate to the students that their opinions have value. These are the same tools engineers use to gather data, analyze data and determine root cause.

Students at all grade levels are learning and using the scientific method to bring about improvement in their learning results. Students are challenged to find ideas for improvement, and they become part of the team that defines measures of success. They know when to continue to search for solutions. They grow up understanding the value of continuous improvement. These skills will bring them success as innovators in any profession they may pursue.

Education and workforce development are key factors to successful economic development. If the United States is to remain a leader in this competitive world, students today must have integrity, be creative problem solvers, learn how to take responsibility for achieving goals, be literate and numerate and be proficient in the processes that today’s workplaces demand. Quality strategies in the classroom bring

results to these goals, which, at the same time, increase the exposure to mathematical and scientific ways of thinking.



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## Reference

1. Lee Jenkins, *Permission to Forget and Nine Other Root Causes of America's Frustration with Education*, ASQ Quality Press, 2005.