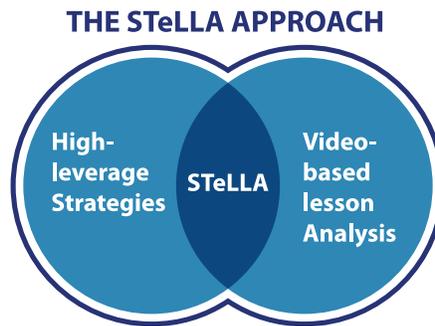


THE STeLLA EFFECT Professional Learning that Transforms Science Teaching

The Vision

The problem was clear and pervasive across the nation. Even when science teachers were engaging their students in the kinds of experiments and hands-on activities that experts recommended, students were not making the connection between these experiences and the scientific ideas they were supposed to be learning. They were not developing the coherent, conceptual understanding of their world that they would need for life in the 21st century.

The recognition of this problem inspired the researchers and educators at BSCS to develop a new method for educating teachers. The product of this 16-year line of research is an approach to teacher professional learning called STeLLA: Science Teachers Learning from Lesson Analysis.



STeLLA brings together two powerful approaches to teacher professional learning. *What* teachers learn in STeLLA is a set of **high-leverage teaching strategies**, identified through research on the instructional practices of highly effective science teachers. *How* teachers learn in STeLLA is through **video-based lesson analysis**, in which they study videos of teachers attempting to implement the STeLLA teaching strategies. The combination—learning to use high-leverage STeLLA teaching strategies through video-based lesson analysis—transforms teaching and learning.

STeLLA Professional Learning is a three-phase process that is facilitated by expert mentors.

PHASE 1	
STeLLA Strategies	Video-based Lesson Analysis
Teachers learn STeLLA strategies, focused on student thinking and coherent instruction.	Teachers analyze videos of other educators using the STeLLA strategies along with their lesson plans and work from their students.
PHASE 2	
STeLLA Strategies	Video-based Lesson Analysis
Teachers use lesson plans designed to encourage the use of STeLLA strategies.	Teachers analyze videos and student work from their own classrooms and reflect on how they can improve.
PHASE 3	
STeLLA Strategies	Video-based Lesson Analysis
Teachers collaboratively plan their own lessons incorporating STeLLA strategies.	Teachers analyze videos and student work from their own classrooms and reflect on how they can improve.

BSCS is an independent nonprofit dedicated to transforming science teaching and learning through research-driven innovation.

Powerful across Contexts

STeLLA is proving to be powerful across contexts. STeLLA has proven effective in both teacher preparation (preservice) and continuing education (inservice) programs; in district-wide programs and in programs enrolling individual teachers; in programs for elementary, middle, and high school teachers; and in programs facilitated in person and online.

	Supporting Current Teachers	Preparing Future Teachers	District-Wide	Online Delivery
Elementary	Tested: Successful Intervention	Tested: Successful Intervention	Implemented: Evaluation Underway	Under Development
Middle & High	Tested: Successful Intervention	Intervention Begins 2018	Implemented: Evaluation Underway	Tested: Successful Intervention

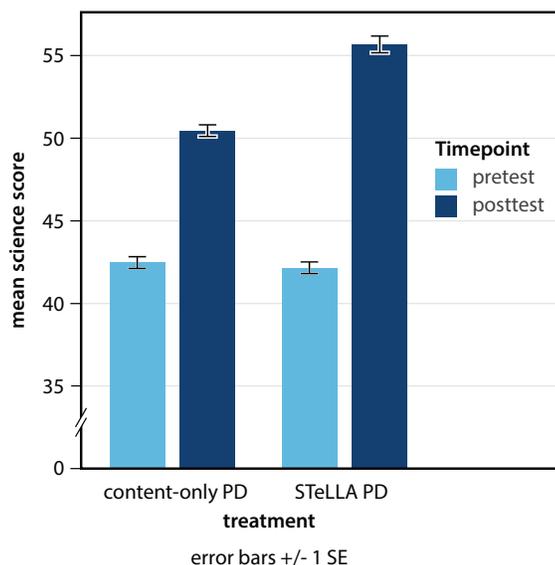
Research Findings

The findings on the STeLLA approach are compelling. Where most studies of teacher professional development only show effects on the participating teachers, studies of STeLLA show major impacts on both teachers and students. The **STeLLA Colorado** (STeLLA CO) research study is a good example.

STeLLA CO was a randomized-controlled study—considered the “gold standard” type of study in educational research. It was conducted with 144 teachers and more than 2,800 students from 16 districts along Colorado’s Front Range. The study compared elementary teachers randomly assigned to either the STeLLA program or a program focused on improving science content understanding, the most common approach to professional development for elementary teachers today.

As shown in the graph, students of teachers in both programs scored equally well during the pretest (light blue). And the scores of both groups improved after instruction (dark blue). However, there was a substantial difference in posttest scores between students whose teachers were in the STeLLA program and students whose teachers were in the traditional program. The **difference in scores was equivalent to 23 percentile points**, meaning the score of a student in the 50th percentile of the STeLLA group would put that student in the 73rd percentile of the traditional group. Test results also showed STeLLA students were able to answer questions involving more complex scientific reasoning than those in the traditional group.

Student Science Scores by Treatment Group



What’s Next?

High quality science education is more important than ever. Teachers must prepare students to succeed in a 21st century society, where scientific reasoning and critical thinking skills are essential. To prepare teachers to achieve this goal, BSCS is working to bring the STeLLA approach to teachers nationwide through partnerships with schools, districts, teacher educators, and funders. Learn more at www.bscs.org/STeLLA

This material is based upon work supported by the National Science Foundation under Awards #0310721, #0918277, #0957996, #1118643, #1220635, #1321242, #1503280, #1725389, and #1813127 and by the Minnesota Department of Education under Award #2016-00170. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation or of the Minnesota Department of Education.