Defining Student Success

Boston Energy in Science Teaching (BEST) defines student success as the ability to connect prior knowledge to a new situation. For BEST, we are striving to have students be able to transfer big ideas of energy between science disciplines (Fig. 1).

Characteristics of student success include:
- Ability to identify big ideas underlying problems.
- Confidence in approaching a problem.
- Increased interest and engagement.
- Increased performance on assessments.
- Persistence in challenges and STEM.
- Ability to relate science to real-world problems.

Research Design

The purpose of BEST is to compare the impact of concept-based Professional Development (PD) in energy vs. discipline-based PD on student success.

- Design: Apply Boston Science Partnership (BSP) strategies developed for biology, chemistry, physics, and earth science to the concept of energy.
- Student success research question: (1-4 of 12 research questions) Do students of teachers who participated in concept-driven PD differ in their understanding of or interest in science compared to the students of teachers who participated in discipline-driven PD at the grade 3-8 level?
- Instruments: Pre-post, matched-pair student/teacher ATLAST assessments, observations, surveys, teacher interviews, district exams, and MCAS.
- Analysis: Compare BEST teachers and their students to non-BEST, BSP teachers and students.
- Outcome: Determine for whom, when, and in what situation concept-driven PD has a greater impact than discipline-driven PD.

Overcoming Challenges

- Teacher Success to get Student Success
  - High quality professional development based on successful BSP strategies
  - How to improve the way we assess the transferance of new teacher knowledge to changes in student knowledge?
- Appropriate Instruments & Compelling Evidence
  - Triangulate data through various types of instruments
  - Will it be enough to show demonstrated change?
  - Attribution between Phase I and Phase II
  - Comparison group for Phase II is Phase I
  - What about other PD teachers take and student experiences?
  - Culture around curriculum/Buy-In
  - Use Energy II course and VT to demonstrate to teachers that energy isn’t extra—connecting the FOSI kits through energy

Partnership

Developing and implementing high quality, concept-driven PD for BPS teachers: PD will lead to more effective and efficient instruction.

- Univ. of Massachusetts Boston (UMB)
- Northeastern University (NEU)
- PERG, Lesley University
- Boston Public Schools (BPS)
- Boston Collaborative for Public Education (BCPE)
- Science Education Development Center (CSDC)
- Southern New Hampshire University (SNHU)
- Education Development Center (EDC)
- Harvard Project on Educational Development (HPED)