

Logic Model for The Science & Engineering Educators' Co-operative (SEE Co-op)

Problem Statement: My students need more timely, directive, and individualized feedback DURING their learning than I have the time, energy, or expertise to provide by myself.

Goal: Create a collaborative organization of teachers who work together to identify common learning targets, construct tools to assess students' mastery of those targets, and analyze student data to improve student learning, teaching practices, and the reliability of the tools developed by the group.

Rationale:

- Students learn best when they clearly know WHAT they are trying to learn, receive timely feedback DURING their learning, and INDIVIDUALIZED feedback on what they need to do to improve their learning.
- Open Source (free) software is available to deliver & manage assessment tools IF high quality content is developed.

Inputs: →

- Middle school and high school science and engineering teachers
- Content Experts- University Faculty
- Science Education Researchers
- Assessment Specialists
- Web and technology tools experts
- Industry based scientists & engineers
- Money

Activities: →

- Regular leadership team meetings to prioritize work of the Co-op
- Summer meetings (4 days) of members to
 - ① establish common learning targets;
 - ② create and/or edit formative assessment tools aligned to the learning targets;
 - ③ analyze student data & create report of notable trends & recommendations for improvements
- Webinars on Co-op topics

Outputs: →

- Co-op website for:
 - ① Teachers to create learning & assessment plans for their science & engineering classes;
 - ② Students & teachers to monitor learning through the administration of the Co-op developed tools;
 - ③ Teachers to collaborate with other teachers on assessment and instructional needs
- Printed and digital learning targets for science & engineering classes with multiple items and tools for assessing each learning target

Outcomes:

Short Term: (Year 1)

- Students in co-op members' classrooms using the developed learning targets and formative assessment tools DURING their learning for at least 2 units during the academic year and performing better than non-co-op students on the given topics on summative assessments (such as state tests).
- Teachers in co-op analyzing student data at multiple points during their instructional units, adjusting teaching practices during the unit, and data-grounded reflecting on learning challenges after the unit with other co-op teachers

Medium Term: (Year 2-3)

- Year 1 outcomes now for 4-5 units in each science and engineering course.
- Co-op teachers creating new authentic project-based-learning activities which require students to apply knowledge & skills in at least one of the instructional units.

Long Term: (Year 3+)

- Year 1 outcomes now for all units in each science and engineering course.
- 1st year teachers using co-op members' evidence-based learning and assessment plans as starting point for their classes in urban, rural, and suburban settings.