



Leading departmentally-based change initiatives: The Science Education Initiative Handbook

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ABSTRACT

Educational change efforts focused at the department level can be powerful. Positive outcomes, however, are not automatic. Here, we share some of the big lessons learned from the Science Education Initiatives (SEIs) designed by Carl Wieman at the University of Colorado Boulder and the University of British Columbia, in which postdoctoral fellows were embedded directly within disciplinary departments as catalysts of change. We have compiled our recommendations and resources into the free **SEI Handbook**.

THE SEI APPROACH

Key assumptions of the approach:

- The logical unit of change is the department.
- Additional resources of time and human capital are needed to support change.
- Faculty expertise is best developed by applying ideas, hence focusing on transformation of specific courses.
- Evidence of impact is an important tool in persuasion and guiding improvements.

Discipline-based education specialists (DBES) embedded directly into departments

- Has expertise in discipline (chemistry, math, etc.) and in teaching and learning.
- Hired into department.
- Partner with department faculty on course transformations.



A DBES provides time and expertise to catalyze changes in faculty teaching practice.

WHAT'S IN THE HANDBOOK?

1: INITIATIVE LEADERS



Set clear expectations for the DBES work, structuring the position and oversight to achieve maximal impact.

Provide training and community for DBESs, ensuring they develop a range of professional skills.

Oversee the initiative, including soliciting proposals, allowing adequate staff time for this task.

2: DEPARTMENT LEADERS

Recruit and hire good DBES candidates, with appropriate skills and mindset.

Manage the project with an appropriate leadership structure, appointing a capable departmental director who can plan and manage the project.

Strategically plan the work, create faculty working groups, focus on influencing faculty, create long-term teaching assignments.

Encourage and incentivize faculty participation by making teaching and learning visible in the department, valuing teaching improvements, and providing incentives.

Make the work visible, keeping faculty continually apprised of the initiative's work.



3: DISCIPLINE-BASED EDUCATION SPECIALISTS

Think of yourself as a catalyst: your input, work, feedback, data collection, and analysis can facilitate new and greater possibilities than the status quo.

Think of yourself as a coach: provide feedback and support for faculty as they encounter the steep learning curve of implementing new teaching practices.

Think of yourself as a change agent: pay attention to issues related to organizational change and conditions helping people to succeed.

Learn a great deal about teaching, learning, and the research around them, and join an emerging community of scholars improving teaching and learning!

DOWNLOADABLE RESOURCES

The Handbook includes many linked resource documents, such as:

- Sample DBES job postings
- DBES training materials
- Departmental long-term plans
- Course transformation expectations
- Department course transformation agreements
- Facilitating discussion about learning goals
- List of SEI assessment indicators



RESULTS FROM THE SEI

The Handbook includes a downloadable list of all metrics used for student, faculty, department, and institutional change.

Major outcomes of the SEI include:

- **Extensive changes in teaching practices** (120 courses at UBC and 50 courses at CU Boulder with significant levels of transformation).
- **Changes in teaching and learning culture**, with students considering active learning relatively normal in departments with substantial SEI involvement.
- **Improved student learning**, based on learning assessments, student self-assessments, and student feedback.
- **Successful careers for DBESs**, with most finding teaching-focused faculty positions, work in teaching centers, or DBER positions.
- **Contributions to scholarly work on teaching and learning**, with a collection of over 120 journal articles, posters, and more.
- **Inspiration of other educational change initiatives**, with the SEI model being sufficiently transportable that it has sparked similar initiatives elsewhere. See the Case Studies in the Handbook.

SEI Handbook: A practical guide to fostering change in university courses and faculty by embedding discipline-based education specialists within departments.

FREE and online at <https://pressbooks.bccampus.ca/seihandbook/>

