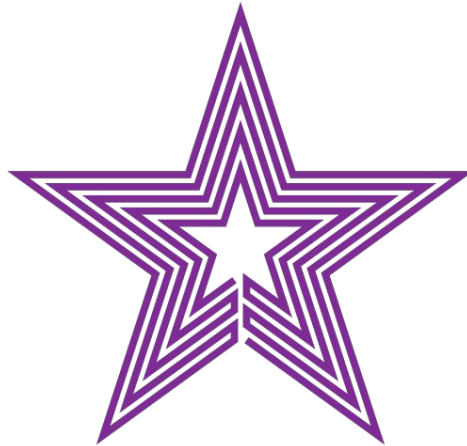# Embedded expert models: Implementing change initiatives which support departments from within

Stephanie Chasteen
(Univ. Colorado Boulder)

Andrea Follmer Greenhoot
(Univ. of Kansas)

Sarah Bean Sherman
(Univ. of British Columbia)

Carolyn Aslan (Cornell Univ.)

The new SEI Handbook is free and online at
https://pressbooks.bccampus.ca/seihandbook/

Handouts and slides and link to discussion forum at our session page:
bit.ly/ASCN-Embed

The Science Education Initiative (SEI)

- A 10-year program at UBC and CU

- Goal: Promote broad use of evidence-based teaching techniques

- Embedded experts: **Discipline-based educational specialists (DBESs)** as catalysts of change within departments
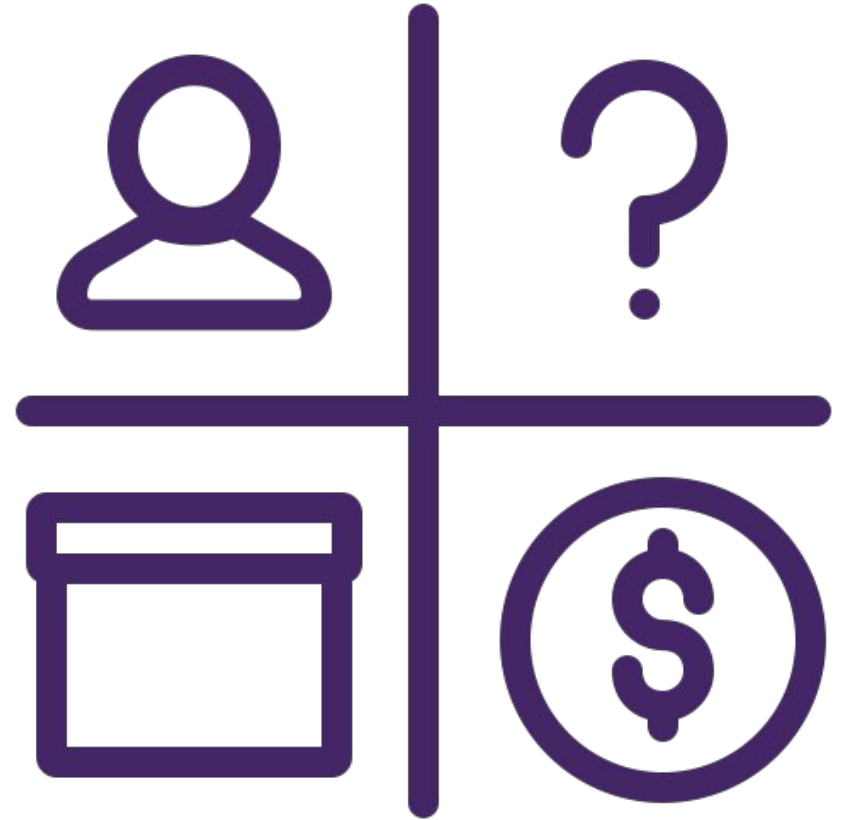

Three DBESs (Cheryl Pinzone, Ruth Heisler, and Teresa Foley) from University of Colorado discuss teaching and learning at a training given by Wieman in 2017 at Stanford. (Credit: Peter LePage / Cornell University. All rights reserved.)

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Handouts and slides and link to discussion forum at our session page: **bit.ly/ASCN-Embed**

Outline of our session

1. **Introduction**: About the embedded expert model

2. **What is an embedded expert**, or *discipline-based educational expert* (DBES)?

3. **How can you support DBESs?**

4. **Engaging faculty and departments**

5. **Open discussion**

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Handouts and slides and link to discussion forum at our session page: **bit.ly/ASCN-Embed**

Introduction: About the SEI model

Stephanie Chasteen (University of Colorado Boulder)

The Science Education Initiative (SEI) Handbook

The Science Education Initiative Handbook

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

SEI HANDBOOK

Stephanie V. Chasteen / Warren J. Code
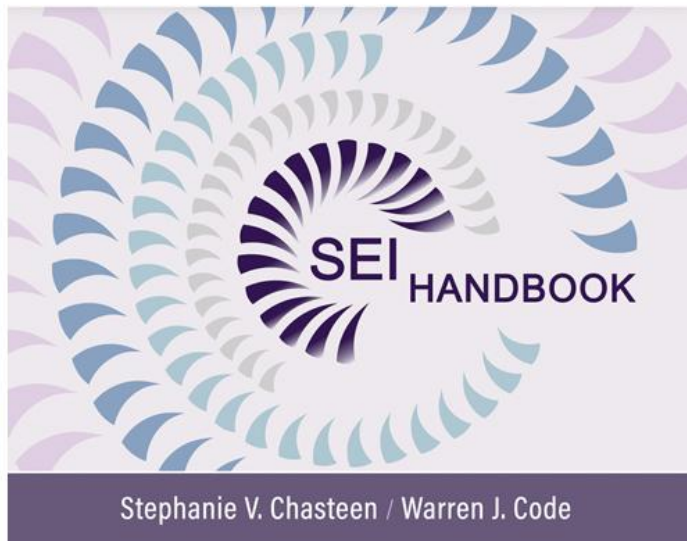
- Practices for success outlined here

- Based on SEI at UBC and CU

- Free and online (print on demand through Amazon):
pressbooks.bccampus.ca/seihandbook

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook
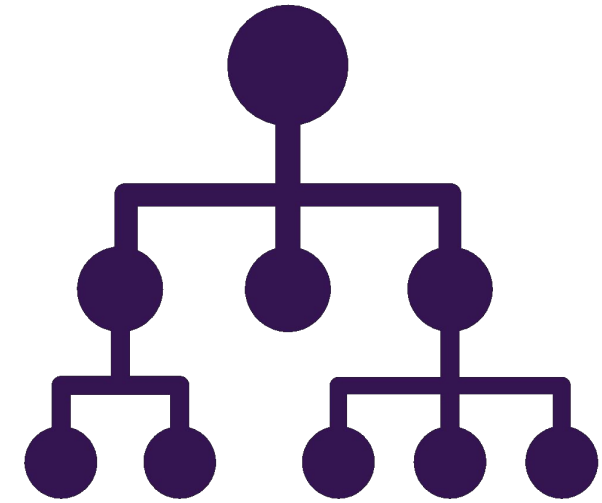
Introduction
What is a DBES?
Supporting DBESs
Engaging faculty
Discussion

The SEI Handbook is meant for everyone!

- Part I: The Initiative Leader's Handbook

- Part II: The Departmental Leader's Handbook

- Part III: The Discipline-Based Education Specialist's Handbook

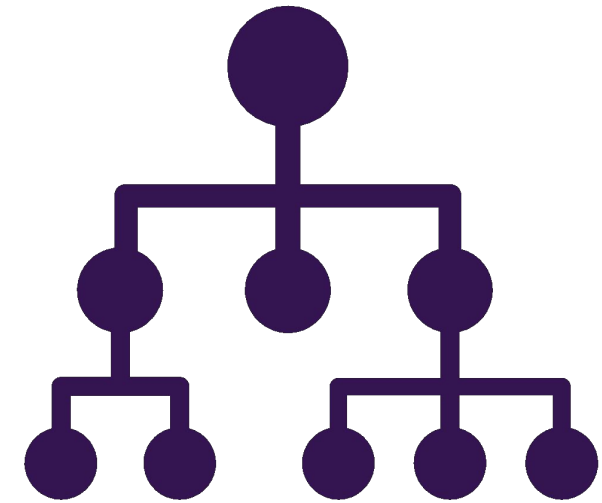SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Introduction
What is a DBES?
Supporting DBESs
Engaging faculty
Discussion

The SEI Handbook is meant for everyone!

- **Part I: The Initiative Leader's Handbook**

- **Part II: The Departmental Leader's Handbook**

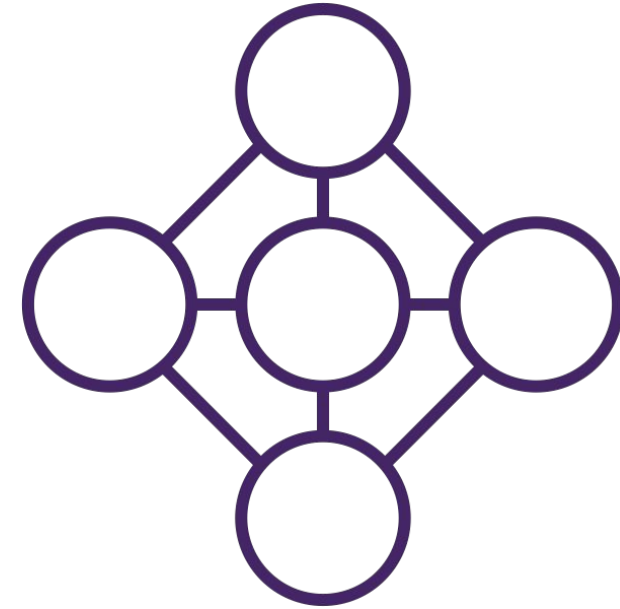- Part III: The Discipline-Based Education Specialist's Handbook

Come to next session (Session A), or watch ASCN webinar archive.

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Introduction
What is a DBES?
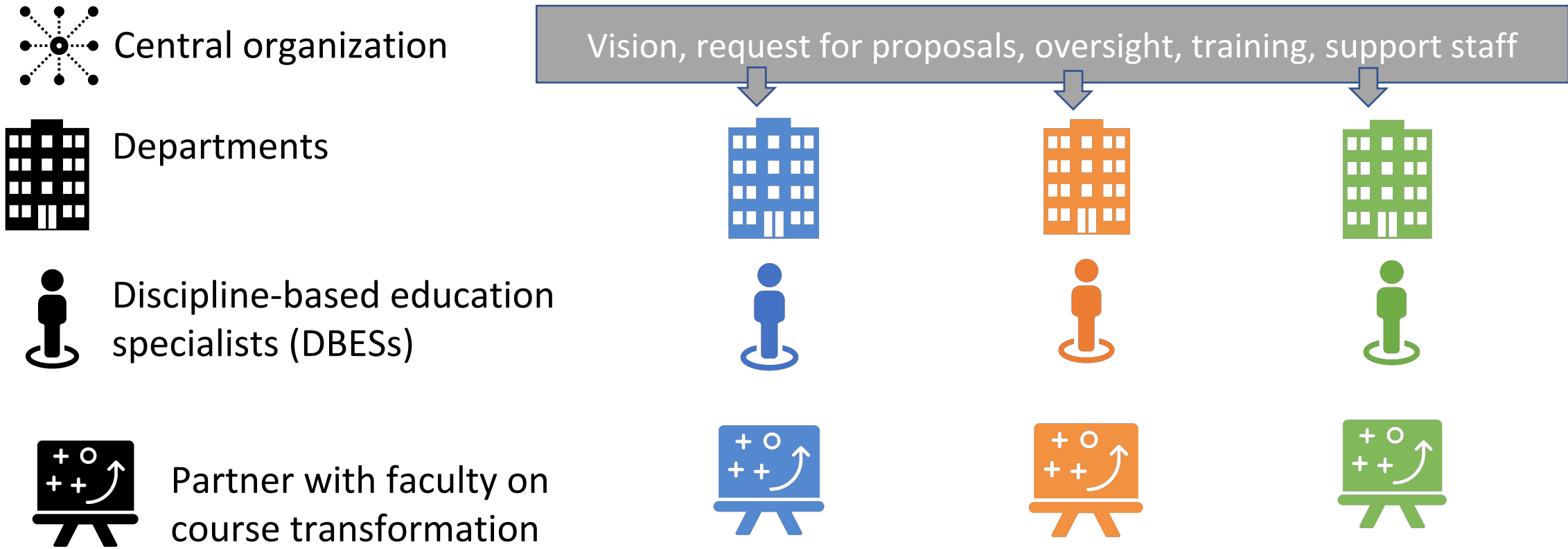Supporting DBESs
Engaging faculty
Discussion

Core elements of SEI model

- **Central unit** (SEI Central)

- **Competitive grants** to departments
    - Most money used to hire DBESs

- **Departmental directors** liaise with SEI Central.

- **Training for DBESs** by SEI Central

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

What is the SEI Model?

Central organization

Vision, request for proposals, oversight, training, support staff

Departments

Discipline-based education specialists (DBESs)

Partner with faculty on course transformation

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Introduction
What is a DBES?
Supporting DBESs
Engaging faculty
Discussion

What is the SEI Model?

Central organization

Vision, request for proposals, oversight, training, support staff

Departments

Discipline-based education specialists (DBESs)

Partner with faculty on course transformation

Other projects are trying variations on this model.

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Introduction
What is a DBES?
Supporting DBESs
Engaging faculty
Discussion

What is the SEI Model?

Central organization

Departments

Discipline-based education specialists (DBESs)

Partner with faculty on course transformation

Vision, request for proposals, oversight, training, support staff

Other projects are trying variations on this model.

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Introduction
What is a DBES?
Supporting DBESs
Engaging faculty
Discussion

What could go wrong in this model?

- DBES not seen as credible expert / colleague

- Low DBES morale / quitting

- Individual faculty or department collectively not following through on commitments

- Teaching methods are not passed on to subsequent instructors

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook
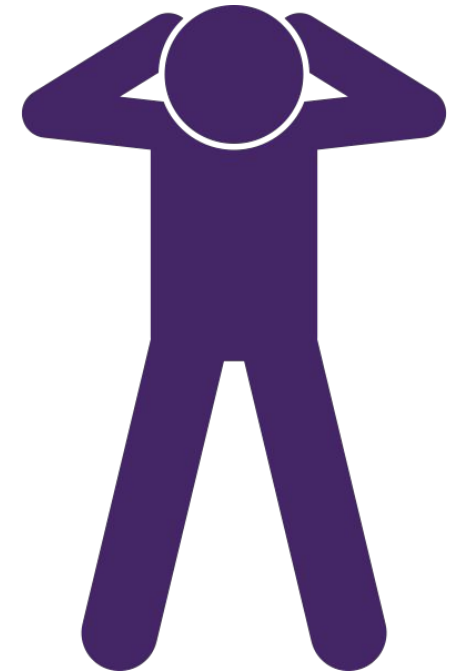
Think-pair

What are your questions about the SEI Model?

Write in your reflection sheet and then share with your neighbor.

These will inform the discussion later on.

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Handouts and slides and link to discussion forum at our session page: **bit.ly/ASCN-Embed**

Our panelists

University of Colorado Boulder
(Stephanie Chasteen)
- Initiative: 2006-2014
- 7 departments, 25 DBESs
- 1-3 DBESs/$650K per department
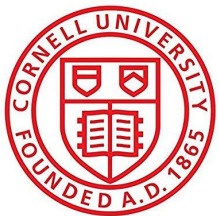- University funded
- New central organization (SEI Central)

University of British Columbia
(Sarah Bean Sherman)
- Initiative: 2007-2017
- 7 departments, 50 DBESs
- 1-4 DBESs/$1.3M per department
- University and donor funded
- New central organization (SEI Central)

Cornell University
(Carolyn Aslan)
- Initiative: 2013-present
- 16 departments, 15 DBESs, so far
- 1-3 DBESs/$500K per department
- University and donor funded
- Center for Teaching Innovation runs program and coordinates with other initiatives.

University of Kansas
(Andrea "Dea" Greenhoot)
- Initiative: 2013-present
- 8 depts/units, 8 DBESs over 6 yrs
- 1 DBES/$250K per department
- University funded (+NSF TRESTLE grant)
- Teaching and learning center coordinates program and related initiatives

What is a DBES* and what is their role?

Stephanie Chasteen (CU Boulder) and

Sarah Bean Sherman (U. British Columbia)

 * discipline-based education specialist

How can we catalyze changes in faculty practice?

Our approach: A DBES (Discipline-based education specialist)

Critical features:

- Hired into dept. (by the dept.)

- High-level disciplinary background

- Trained in teaching and learning

Preferable features:

- 2-3 year or **permanent, full-time** position

- Multiple DBESs at once

DBES Sarah Bean Sherman consults with a faculty member at UBC. (Credit: Faculty of Science / University of British Columbia. All rights reserved.)

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

https://pressbooks.bccampus.ca/seihandbook/chapter/what-is-a-discipline-based-education-specialist/

Who could serve as a DBES?

- **Postdocs in discipline** with training in education

- **Graduate students** with a background in education (e.g., K-12 experience or in School of Education)

- Time allocated for **"Science Faculty with Education Specialties" (SFES)***, including:

  - **Professors of Practice** (including LPSOEs)

  - **DBER faculty**

- **Faculty leaders** who have gone through a training or course transformation experience.

https://pressbooks.bccampus.ca/seihandbook

* 10+ years research by Bush, Stevens, Tanner, Williams & co.; see recent "Origins of SFES…" article for latest and references: https://doi.org/10.1093/biosci/bix015

What kind of help can DBESs provide faculty?

- Support **course transformation** activities

- **Analyze data** on student learning

- **Facilitate discussions** around teaching

- **Facilitate workshops** on teaching & learning

- Serve as a **departmental resource**

- **Conduct research** and disseminate results

- Engage in own **professional development**

- **Give reports** to a central organization

DBESs Leilani Arthurs and Jennifer Stempien host departmental celebration for tutors in the Geology department (Credit: Leilani Arthurs / CU Boulder. All rights reserved).

https://pressbooks.bccampus.ca/seihandbook

Potential pitfalls?

Possible DBES duties:

- Support **course transformation** activities
- **Analyze data** on student learning
- **Facilitate discussions** around teaching
- Serve as a **departmental resource**
- **Conduct research** and disseminate results
- Engage in own **professional development**
- **Give reports** to a central organization

A DBES should NOT be primarily treated as a:

- Glorified teaching assistant

- Teacher

- Instructional designer

- Education researcher

https://pressbooks.bccampus.ca/seihandbook

Introduction
What is a DBES?
Supporting DBESs
Engaging faculty
Discussion

SEI HANDBOOK

How can a DBES fulfill this difficult role?

An effective DBES:

- **works well with people.**

- is **organized.**

- is knowledgeable about **educational strategies and assessment.**

- focuses on **their own professional growth.**

Which of these should the DBES come in with? Which are learned?

DBES Brett Gilley works with faculty at an event (Credit: Centre for Teaching, Learning and Technology / University of British Columbia. All rights reserved.)

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Discussion: What is a DBES and what is their role?

Comments from panelists?

Questions from the audience?

https://pressbooks.bccampus.ca/seihandbook

Handouts and slides and link to discussion forum at our session page: **bit.ly/ASCN-Embed**

How can you support DBESs? Community and training

Dea Greenhoot (U. Kansas) and

Sarah Bean Sherman (UBC)

Warren Code facilitates a community of practice around course design (Credit: Centre for Teaching, Learning and Technology / University of British Columbia. All rights reserved.)

Introduction
What is a DBES?
Supporting DBESs
Engaging faculty
Discussion

How can you support DBESs?

Four areas of support based on lessons learned from SEI at CU and UBC, and the literature on supporting change:
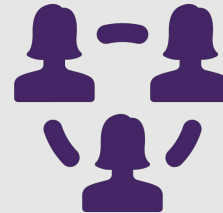
Teaching and Learning Expertise

Mentoring and Professional Development

Community and Social Support

Recognition and Value

Smaller programs can expand support through synergies with other programs and cross-institution networking.

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Teaching and Learning Expertise

Goal

Example Strategies

Learn about evidence-based pedagogy

DBES Boot Camp

Regular Reading Group/ Seminar

TRESTLE Network Meeting/Course Transformation Institute

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Mentoring and Professional Development

Goal

Acquire skills and experience in education research/ scholarship and leadership

Example Strategies

Faculty Mentor in Department

Regular DBES Meetings/ Working Group

Teaching Scholarship Consortium

Attend/Present at Professional Meetings

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Community and Social Support

Goal

Create opportunities for idea exchange and collaboration,
Maintain morale,
Avoid isolation

Example Strategies

Regular DBES Meetings/ Working Group

University-Wide Consortium on Course Transformation (C21)

Cross-Institution TRESTLE Network (www.trestlenetwork.org)

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Recognition and Value

Goal

Example Strategies

Reward and give visibility to DBES's work, Influence Social norms

Annual Event Showcasing and Celebrating Work

Visibility with University Leadership

Features on Website(s)

Presentations at Department Colloquia

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Train DBESs and provide a supportive community

Goal	SEI Strategy
Teaching and learning expertise	• Development Series for new DBESs
Community and professional development	• Regular DBES meetings • (including "exit talks" from departing DBESs) • Regular reading group • Online forum (Basecamp) • Facilitate Development Series for new DBESs • Attend workshops & professional meetings
Professional growth and morale	• Meta-DBES meetings paired with a partner • Facilitate workshops • Presentations at professional meetings
Community and recognition	• Annual End of Year Event

HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Introduction
What is a DBES?
Supporting DBESs
Engaging faculty
Discussion

What are common challenges for DBESs?

- Avoiding isolation

- Maintaining morale

- Learning pedagogical content

- Publishing research

- If a Postdoc:
  - Temporary, low-status, low visibility

- If an Instructor:
  - Lack of time, self-confidence, self-efficacy, marginalized

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Discussion and Q&A: How can you support DBESs?

Comments from panelists?

Questions from audience?

SEI HANDBOOK

Engaging faculty and departments

Carolyn Aslan (Cornell University) and Stephanie Chasteen (CU Boulder)

BESs in CU Geology SEI at a departmental thank-you lunch (Credit: Leilani Arthurs / CU Boulder. All rights reserved).

Generating enthusiasm among faculty

Cornell faculty sharing their experiences with implementing active learning strategies

- Competitive grants get attention, prestige, and time for change

- Visible support from administration

- Enthusiastic presentations by faculty

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Faculty incentives and benefits

Increased enjoyment and effectiveness of teaching

Visibility and recognition of faculty efforts

- Highlight success to administrators
- Feature efforts at meetings, events
- Teaching awards

Direct support: Summer salary, TAs, teaching buy-outs, coveted course assignments. *Time* is precious resource.

Introduction
What is a DBES?
Supporting DBESs
Engaging faculty
Discussion

Support proposal development

Provide a detailed RFP

Two-stage process of pre-proposals and final proposals

- Meet with departments to discuss proposals

Ask departments to discuss proposal at a faculty meeting for input and buy-in

SEI HANDBOOK

Review proposals for elements of success/red flags

- Is there evidence of faculty consensus and engagement across the department, or does the proposal seem led by an individual champion only?

- Is there an individual willing to serve as departmental director?

- Are there existing structures in the department (such as a curriculum committee) and are those likely to help or hinder?

- Is the department distracted by other looming priorities?

- How ready is the department for change?

Maintain good communication and engagement

Establish clear expectations

- don't leave the DBES to fend for themselves

Regular meetings with project teams

Require progress reports

Share experiences and best-practices

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Discussion and Q&A: Engaging departments and faculty

Comments from panelists?

Questions from audience?

Handouts and slides and link to discussion forum at our session page: **bit.ly/ASCN-Embed**

In conclusion: Big lessons learned from SEI

- **It's possible to achieve widespread departmental change** (yay!).
    - Most faculty want to teach well; the formal incentive system is a big barrier.
- **Change takes time!**
    - For us, ~2 years/course, 6-7 years/department.
- **Department-level focus with DBES was effective.**
    - But need adequate funding.
- **Oversight is essential.**
- **This is a transportable model.** Many other programs were inspired by the SEI.

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Open discussion and Q&A

Handouts and slides and link to discussion forum at our session page: **bit.ly/ASCN-Embed**

How to assess the efforts?

Assessment can be tough! Can assess changes to **courses**, **student** learning, **faculty** practice, **departmental** norms, and features of **initiative**.

- See Handbook for list of metrics and challenges
- See TRESTLE website for variety of resources too: trestlenetwork.org

Examples:
- Student performance data
- Faculty surveys, classroom observations (COPUS)
- Course transformation and faculty engagement structured checklist
- Case studies of departments

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

How to sustain the efforts?

Sustainability involves **addressing multiple areas of the system**, and **making change visible**.

- **Departmental sustainability plan**:
  - Departmental events to share work (talks, brownbags, newsletters)
  - Co-teaching and other instructor-instructor communication.
  - Long-term teaching assignments

- **Cross-department events** (annual celebration, invited speakers)

- **Highlight success to administrators** (see Handbook for possible roles for dean).

- **Collect data**

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Also in the Handbook… How to *be* a good DBES

- Tips on course transformation

- How to partner with faculty – coaching and persuading

- Developing your skills and overcoming challenges

- Next session (A): *How to be a great embedded expert!*

- See also the recorded ASCN Webinar (linked in session page)

SEI department director Sara Harris with DBES Ido Roll at a UBC SEI event. (Credit: Gabriel Lascu / Science Centre for Learning and Teaching / University of British Columbia. All rights reserved.)

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Too much information?

That's why we wrote the Handbook!

See end-of-chapter checklists, plus many examples of our strategies (RFPs, job advertisements, training agendas, etc.)

Handbook Raffle:

Number 14 is a winner!

Chapter 6 Checklist

In order to develop high-quality courses with potential for sustainability, departmental leaders should consider the following actions:

Plan the course transformation

- Consider focusing on interested faculty, rather than on specific courses.
- Plan teaching assignments for two or three iterations of a course.
- Allow several terms for the transformation, including a planning term, a first teaching semester, and a second teaching semester.

Create shared expectations for DBES/faculty collaboration

- Discuss the working relationship with faculty in advance.
- Document the DBES role in writing.
- Create a written agreement for the collaboration between the DBES and faculty.
- Monitor collaborations and intervene if problems arise.

Plan for sustainability and culture change

- Create a plan for sustainability early in the project.
- Generate departmental expectations about content and pedagogy to be used in the course in future.
- Consider co-teaching models to bring new faculty into the approach.
- Create long-term teaching assignments for the course.
- Share the work in the department through faculty meetings and newsletters.
- Connect the instructor who first teaches the transformed course with planned future instructors of the course.
- Create a course materials package that is transferable.

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook

Find it at pressbooks.bccampus.ca/seihandbook

Print copies available for purchase on Amazon.com

The Science Education Initiative Handbook

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

SEI HANDBOOK

Stephanie V. Chasteen / Warren J. Code

Handouts and slides and link to discussion forum at our session page: **bit.ly/ASCN-Embed**

NSF

TRESTLE
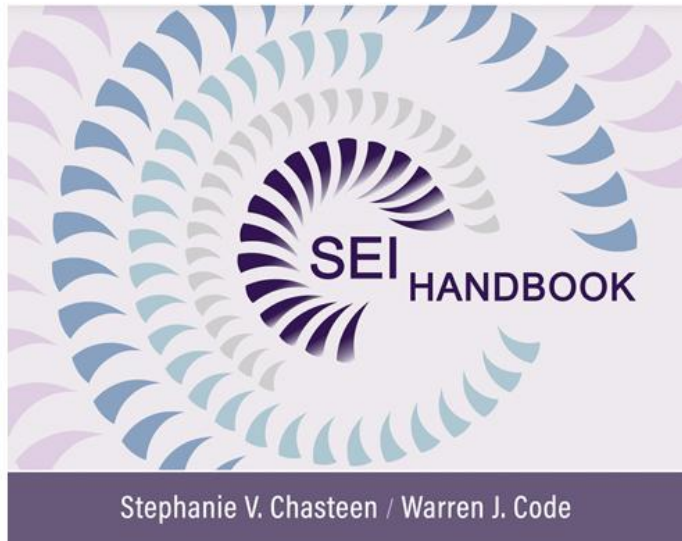
A special thanks to our collaborators on the SEI Handbook:

- **The DBES communities** at CU Boulder and UBC

- **Carl Wieman** and **Sarah Gilbert** (Stanford University) and **Kathy Perkins** (University of Colorado Boulder)

- We thank the authors of the case studies which accompany this book: **Kyle Trenshaw**(formerly of Brown University), **Peter Lepage** (Cornell University), **Barbara Bruno**(University of Hawai'i), **Simone Buitendijk** and **Hailey Smith** (Imperial College London), and **Andrea Greenhoot** (University of Kansas).

SEI HANDBOOK

https://pressbooks.bccampus.ca/seihandbook