

Incorporation Sustainability into Introductory/PBL Engineering Courses

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1. Introduction

This multi-institutional project focused on engaging and supporting faculty who teach introductory engineering courses to incorporate sustainability concepts using the EOP Framework and their resources. While each institution had different levels of support towards sustainability efforts, we found that there was still a need of sustainability focused teaching professional development for faculty who mostly imparts introductory engineering courses or non-engineering courses for engineer students.

This project supported the development and implementation of a two-session workshop, targeting and supporting faculty from diverse institutions, including community colleges, mid-size teaching focused universities, and mid-size research focused universities.

2. Methods

The project was divided into two phases:

Phase 1: Faculty Workshop Session

Phase 2: Faculty Support Session

Figure 1 show the time-frame of the phases and its components.

Faculty Workshop Session: Showcase the EOP Framework and its resources in junction with the Backwards Course Design (BCD) method as a simple tool for faculty to include sustainability topics in their courses. We used the BCD method in conjunction with the EOP (Figure 2) to guide faculty to easily prepare course modules that include sustainability concepts. The workshop spread across two sessions, each lasting two hours, designed to optimize participation.

We encourage faculty to familiarize with the EOP and use their resources when planning or improving course activities for their next term.

Faculty Support Session: Create a colloquial network of faculty interested in using the EOP across different institutions and areas of specialty.

Provide the participants with on-demand support to develop and implement sustainability concepts in their courses.

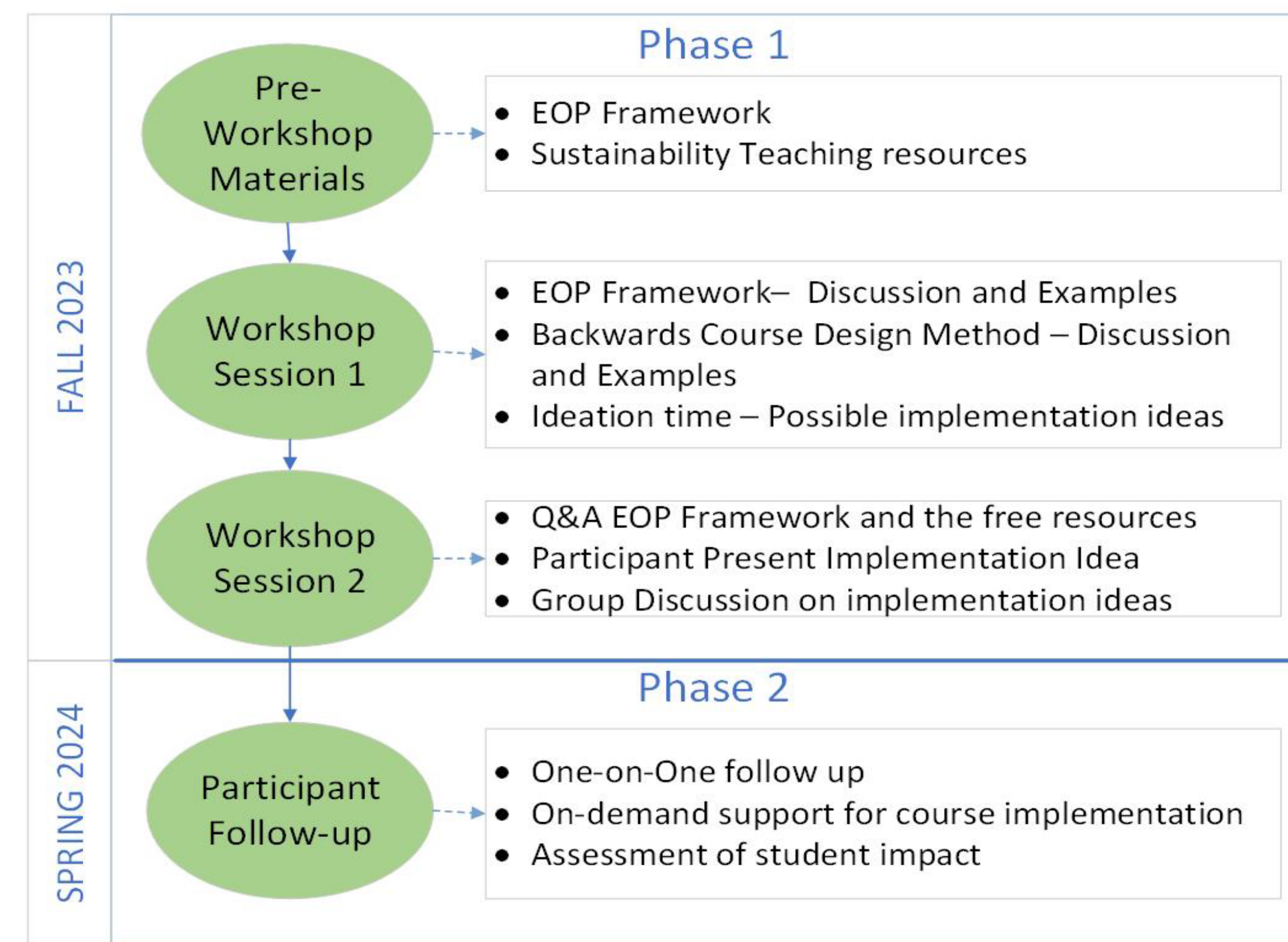


Figure 1: Project phases and its components

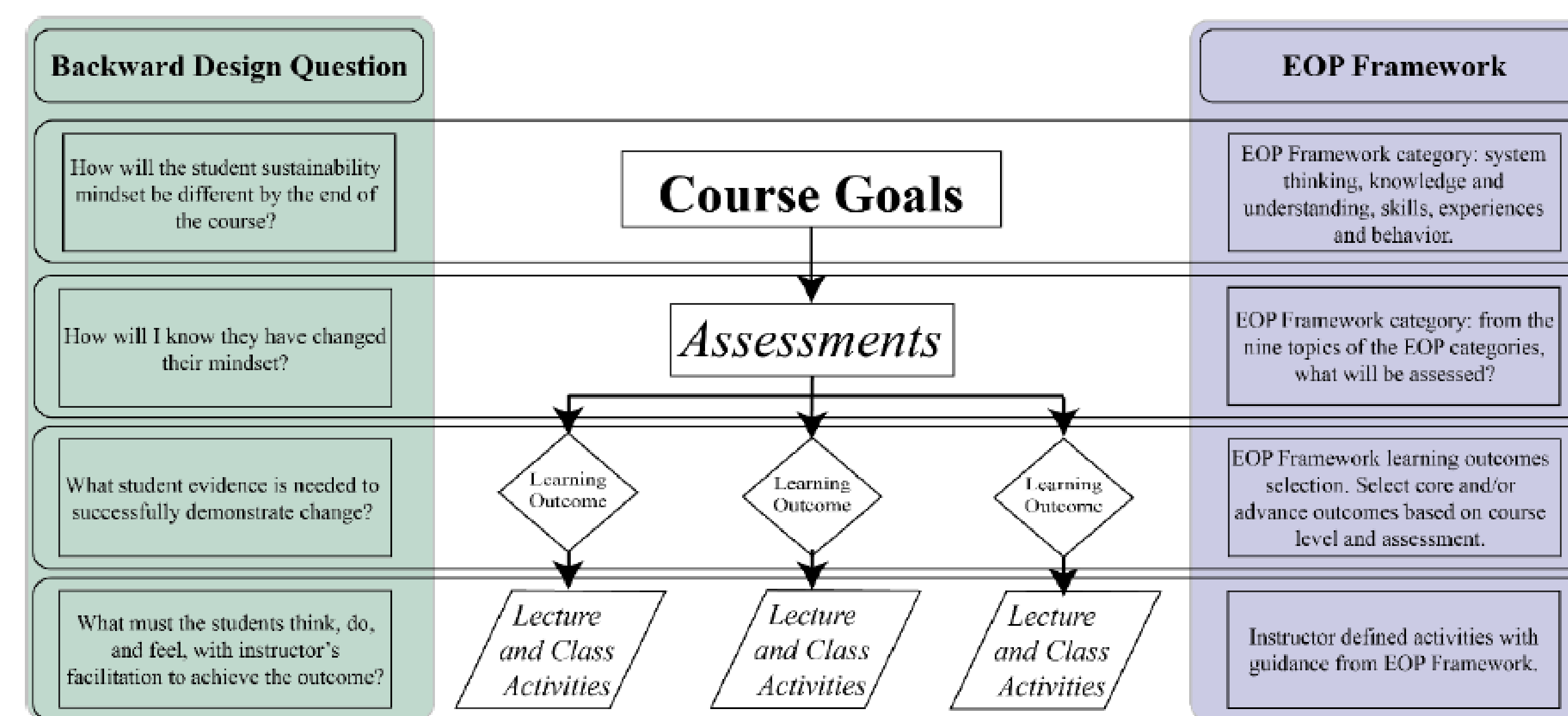


Figure 2: Backwards Course Design method questions incorporating the EOP Framework

Institution	register	attend
Community College	3	3
4+ year primarily teaching institution	1	1
4+ year primarily research institution	8	5

Teaching Areas
Engineering
Engineering Technology
Construction
Management
Biology

How do you categorize your familiarity with the Engineering for One Planet Initiative	Before	After
Not familiar at all	50%	0%
Slightly familiar	0%	0%
Moderately familiar	25%	50%
Very familiar	0%	25%
Extremely familiar	25%	25%

I believed that teaching sustainability concepts in my courses is?	Before	After
Extremely difficult	0%	0%
Somewhat difficult	25%	0%
Neither easy nor difficult	50%	25%
Somewhat easy	0%	50%
Extremely easy	25%	25%

Acknowledgments:

We are grateful for the amazing discussions, engagement and contributions from the participants.

We would also want to thank our mentors:
Dr. James F. Groves and Dr. Irene Mena Lora

Special thanks to the Lemelson Foundation and ASEE for their supporting towards sustainability education.

3. Progress and Plan for Scaling Up

Phase 1 was completed during the Fall 2023 semester. The main component of the project “The Faculty Workshop” was developed and deployed in the month of November. A registration link and flyer was created and distributed across several institutions resulting in a total of 13 registered participants with 9 of them attending both workshops.

Phase 2 is currently running during the Spring 2024 term. This phase will follow-up with workshop participants and will provide support for participants implementing their idea in the classroom.

Scaling-Up

A second workshop is plan to be offer later in the Spring semester targeting more institutions and faculty from non-engineering departments who teach mostly to engineering students. Faculty who teach Sciences and Math to the engineering students will greatly benefit from the EOP Framework and their resources. Engineering students will then encounter sustainability concepts early on their academic career and across other disciplines.

4. Evaluation and Impact

A survey was used to gather insights from the participants including some demographic data. The survey used a combination of 5 Likert scale questions with reflective before and after questions.

Tables 1 and 2 showcase important demographic data from the participants.

Tables 3 and 4 showcase important insights into the impact of the project.

References:

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