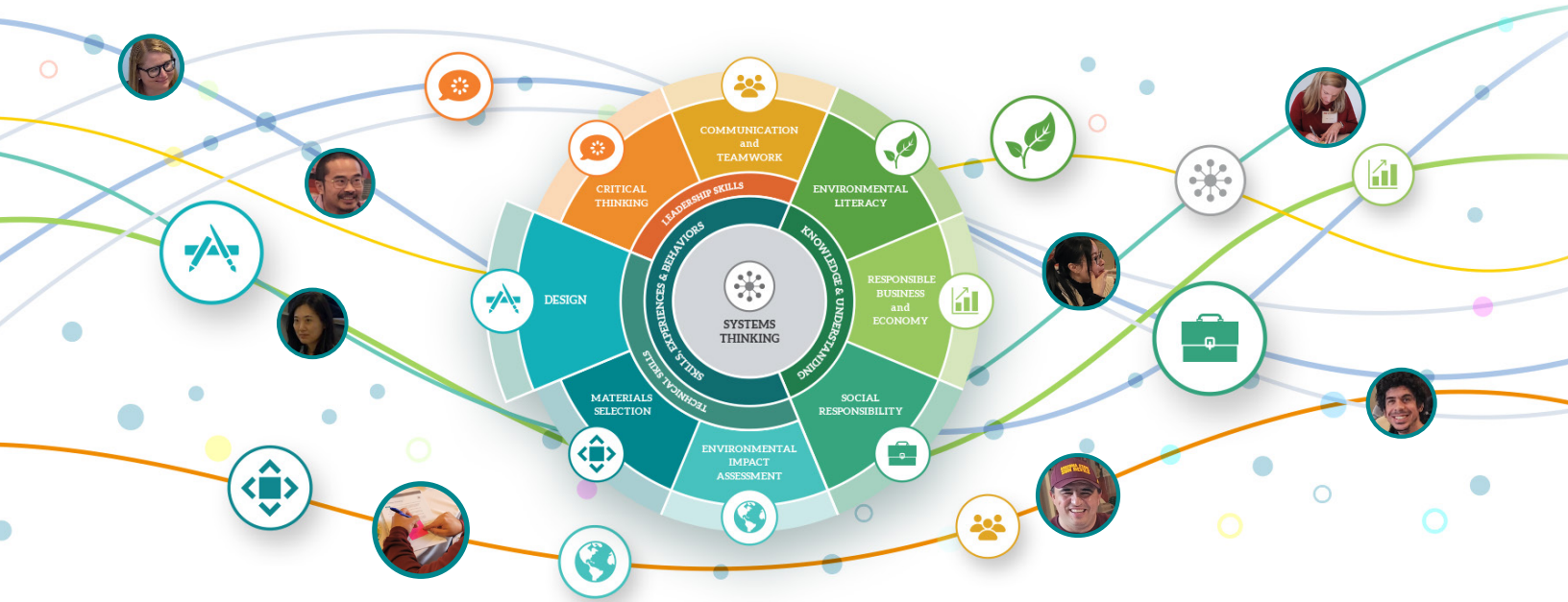# Engineering for One Planet

Guide for Institutional Capacity Building Using the EOP Framework

Activities and guidance for designing Fellowship programs that seek to institutionalize the EOP Framework.

Prepared by
The Sustainability Teachers' Academies at Arizona State University

Powered by
The Lemelson Foundation

ASU
ARIZONA STATE UNIVERSITY

Background and Introduction

This guide serves as a companion to the Engineering for One Planet (EOP) Framework.

Purpose:

This guide was produced using practices and approaches developed during the 23-24 EOP Faculty Fellowship at Arizona State University (ASU). After extensive conversations with partners and stakeholders, these activities, frameworks, and explanations were gathered together with the goal of helping other institutions implement Fellowships that teach faculty how to use the EOP Framework.

While we outline our programmatic structure, we understand that effective and lasting sustainability efforts must be specific to the environment in which they are implemented. Therefore, the goal of this guide is to help program leads design strategies that will be effective in their own contexts. While you may duplicate our work exactly, we encourage you to consider how your context differs from ours, and adjust your efforts accordingly.

This guide is meant for individuals that are already trained in the EOP Framework and are looking to share it with others. If you are just learning about the EOP Framework and in the process of integrating it into your own work, we suggest exploring the activity guides that are provided for free on the EOP website (https://engineeringforoneplanet.org/).

Foreword

A decade ago, I participated in a program that gave K-12 teachers and high school students the opportunity to engage with real solar panel engineering research done at ASU. I had just scrambled my way through my first year of teaching and was looking for ways to change the (many, many) things that hadn't gone well. During one of the sessions, I heard a student ask the educational director if she was an engineer. While the director rejected the title of engineer, the conversation changed my perspective.

Fundamentally, good teachers are classroom engineers. We have products (a classroom, course content, program curriculum) that we are tasked with developing. We research, design, prototype, and test ideas for the creation of those products. We investigate how the educational design influenced the outcomes and continue to iterate with a particular determination found only in work that truly matters.

Thinking of myself as an educational engineer changed the way I taught and now changes the way I facilitate. I stopped seeing each difficult day at work as a personal failure, and started viewing it as a part of the process of iterative design. I did research on effective teaching practices and the theories behind them so that my design could be supported by evidence. I saw how interesting, engaging, and fun lessons proved to be successful engagement methods, so I mentally picked them apart for which elements and strategies were most effective for future iterations. Iterations moved me forward through the engineering design process without the personal defeat that teachers so often feel.

The next big step I took in understanding my educational framework was working with Molly and Darshan. PI Molly Cashion gave me the framework and learning theory needed to explain my educational perspective, and guided this program using critical pedagogy.

Co-PI Darshan Karwat showed me what great lessons were possible using the EOP Framework, and demonstrated humanizing pedagogy through action by working so thoughtfully with individual Fellows. This was the educational engineering team that guided this program, and their perspectives impacted me as much as their work impacted the program.

It is from this groundwork (as well as vital internal and external support) that we engineered the EOP Faculty Fellowship at ASU. You'll see the design and facilitation methods we used in the creation of this program on pages 1-2 and the logistical information for our particular program on pages 12-21. However, I think that the most useful portions to anyone who is interested in creating their own Fellowship is on pages 4-9. While we designed this Fellowship from our perspectives and for our context, the activities and methods may not be ideal for use in your environment. After all, good products are designed to be contextually effective. Therefore, pages 4-9 were developed to help you research and design your own program using your preferred educational philosophy.

Sustainability education is critical to the development of the engineers that will create our future. Consider appropriate, interesting implementation of the EOP Framework to be the product of your program. Know that your collaboration with your fellows will be moving the field towards a sustainable future. You, as the program designer, are the engineer.

You are Engineering for One Planet.

Allison Wolf
Senior Program Coordinator
The Sustainability Teachers' Academies at ASU

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ASU's Programmatic Structure

Our Fellowship was based in critical and humanizing pedagogy, which shaped the way that we ran our program. While these practices were central to achieving our desired outcomes, the goal of this portfolio is to help you design a Fellowship to meet your own context. As a result, we outlined our programmatic structure to encourage you to consider your own.

Team Members

Molly Cashion (PI)

Darshan Karwat (Co-PI)

Adam Carberry (Co-PI) **

Allison Wolf (Program Coordinator)

Aditi Gupta (Graphic Designer)

Program Outline

Supported by Learning & Teaching Hub

Working Retreat — COP — Reflection Workshop — COP — Mini Conference — EOP Portfolio

1 on 1 mentorship provided throughout by Co-PI Karwat

CGF Instructional Design team review of materials using the COPUS protocol

Program Objectives

- Faculty will define and demonstrate the EOP Framework. Then, they will analyze their own courses to design an appropriate integration strategy for learning outcomes from the EOP Framework.
- Faculty will participate in a learning community that fosters a community of practice around the integration of the EOP Framework.
- The Program team will develop a Training Portfolio to facilitate the integration of the EOP Framework into any engineering classroom.
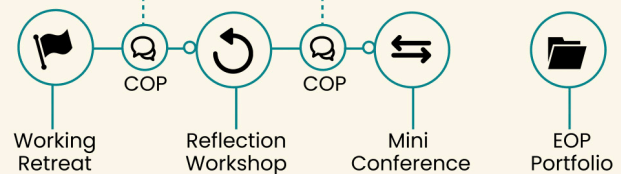
Internal Support

- The Learning and Teaching Hub (LTH) provided instructional design, assessment training, and classroom observations. Associate Director Dr. Medha Dalal was pivotal in this relationship.

- The Instructional Design team in the College of Global Futures trained our Fellows on culturally inclusive pedagogy and provided classroom observations.

External Support

- **Dr. Adam Carberry at Ohio State University led as a Co-PI on the project until his transition to OSU.

- Dr. Roneisha Worthy from Kennesaw State University served as a thought partner and speaker at our Reflection Workshop.

Theoretical Approach

The ultimate aim of our critical pedagogical approach to sustainability education is social change for a sustainable and just future. Because sustainability education must consider intersectional systemic issues that have led to social and environmental injustices, our fellowship programs are underpinned by critical and humanizing pedagogy to center justice in our instructional practices. Here we describe the **central principles**, **instructional practices**, and **intended outcomes** of our fellowship programs.

Central Principles

Critical Pedagogy describes a teaching practice that encourages learners to question systems of power and oppression and take action for social change (Freire, 2018). Humanizing pedagogy, in contrast to systems of oppression that often dehumanize people trapped within those systems, reimagines the principles of practices of critical pedagogy to prioritize the "full development of the human" to transform education to facilitate liberation for all (Salazar, 2013, p. 128).

Intended Outcomes

We use the critical professional development (CPD) framework to prioritize and assess critical outcomes (Kohli et al., 2015). Critical professional development should:
1. Develop cooperative space
2. Build unity
3. Provide shared leadership
4. Address context-specific concerns

Instructional Practices

Practice	Objectives
Permeable and Contextualized Content	• Draws on participant's knowledge and resources in order to integrate their prior knowledge with others into the learning materials • Should consider and/or connect with larger systems and issues • Learners and facilitators should engage in analytical discussions of the systems of power and historical context that influence the content • Content should be subject to critical reflection
Dialogic Action	• Centers learners as subjects and active participants in their learning • Reflection and action are driven by dialogue • Group discussions are used as collaborative reflective activities • Facilitator/educator should be a co-creator of knowledge
Critical Reflection	• Examines individual identity and multiple perspectives in the social, cultural and/or political context of the experience • Facilitator/educator should provide multiple opportunities and modalities for participants to reflect • Should be both individual and collective

Designing Your Own Fellowship

Your One Minute Why

Objective

Your facilitation team is obviously interested in sustainability and sustainability education, but those terms can mean very different things to different people! This activity can be used to help your team come to a central understanding of what sustainability is and why it matters in the engineering education field.

Activity

➡ Take a moment to get outside—sit or take a walk while you consider why you're interested in sustainability or sustainability education. Some prompts to help you:

- Why is sustainability important to you (personally AND professionally)?
- Can you think of a moment when you felt particularly connected to the world around you?
- What about a moment that inspired you to begin your sustainability journey?
- Why did you become an educator?

➡ Start drafting your "speech." You may start by writing or recording yourself talking. Then, pick out the best parts to construct your One Minute Why. Your goal should be that your completed "speech" can be communicated in under a minute.

➡ Share your One Minute Why with your facilitation team. It's ok if it sounds corny or cliche! The most important thing is that it reflects why you're invested in our collective future.

➡ Discuss similarities and differences between your speeches. What do you have in common? What unique experiences have shaped your passion for sustainability? Could you design a collective "One Minute Why" for your team?

➡ Consider how you might communicate your passion for sustainability and underscore its importance to your Fellows.

The PI team shared about their passion for sustainability on the first night of the Fellowship.

Informal Assessment

Objective

Informal assessments are central to effective teaching and facilitation, especially when the learning material is scaffolded in difficulty. Informal assessments should be considered "checkpoints" in which facilitators can gain essential feedback on the effectiveness of their methods. In engineering terms, informal assessments are an opportunity to test a prototype (your facilitation) and figure out what's working and what isn't. Like a good engineer, a good facilitator should take that precious information and use it to tweak the prototype. While facilitators gain valuable information about their participants' readiness to advance, it also gives participants the opportunity to reflect and digest the information they have received.

Activity

➡️ Review your objectives for the Fellowship, and consider what strategic objectives need to be met in each workshop.

➡️ For each workshop objective, outline how and when in the workshop you are going to assess if your participants have met that objective. Consider Bloom's Taxonomy when evaluating depth of understanding. How might you assess if your participants are internalizing the knowledge versus simply repeating it back to you?

➡️ Outline your objectives and define at least one way in which you will informally assess participant understanding.

How to Review?

While review questions are a quick and effective method for building in informal assessment and gathering information about participant learning quickly, they tend to make this opportunity to collect feedback a little boring. Consider the options below when designing moments of informal assessment (if you are unfamiliar with a method, you can learn more about it by googling it).

- Think, Pair, Share
- I Used to Think, Now I Think
- What, So What, Now What
- Exit Slips
- Polling software (like slido)
- Thumbs Up, Thumbs Down
- Small Group Discussion
- Fist to Five

Organizing Your Program

Objective

Finding time to meet and plan with your team can be quite challenging when everyone is busy, so this program organization tool is a great way to maximize your time together to ensure that your roles and responsibilities are clearly defined.

Activity

➡️ Ensure objectives for your program are already clearly defined and outlined.

➡️ Give everyone a set of sticky notes. Set a 10 minute timer and have everyone write down one action item per sticky note as it relates to planning the program. Action items must be singular steps that have a verb attached to them ("schedule the caterer" is a good example, while "food" is a bad example). Each person should write down as many action steps as they can on separate post it notes.

➡️ When the timer goes off, have each person share their sticky notes and start to organize them into meaningful groups together on a whiteboard. For example, one team member's sticky note that reads "schedule monthly meetings" might be grouped together with another member's note that says "find guest speakers." After a couple of team members share out, there should be some natural clusters of tasks that begin to form.

➡️ Collect the clusters of tasks and hand team members one cluster each. Have them title the pile and give the tasks a chronological order. The program manager or coordinator can take the organized piles and put them in a gantt chart or other organizational tool. Tasks can be assigned once they are organized.

or

Collect the clusters of tasks and hand team members one cluster each. Have them title the pile and give the tasks a chronological order. The program manager or coordinator can take the organized piles and put them in a gantt chart or other organizational tool. Tasks can be assigned once they are organized.

Defining Your Facilitator Philosophy

Objective

During the working retreat, we asked our Faculty Fellows to define their teaching philosophies so that they considered how it would play into the activity they designed. As a facilitator, it's a good idea to define your own teaching philosophy (or "facilitator philosophy") both to aid in workshop design and to understand your team's philosophies. This activity can be modified for use in workshops.

Activity

➡ Spend ten minutes brainstorming what values are important to you as an educator. Consider the following prompts:
- What is your approach to assessments, assignments, student interactions, and grading scales?
- What are the most important things you can share with your students?
- What does it mean to be a "good teacher"?

➡ Discuss your thoughts with your team. What approaches to teaching do you share in common? How do your approaches differ? What experiences have shaped your perspectives on this topic?

➡ Come to a consensus on three or four main facilitator philosophies to focus on as a team. These focal points will help you design activities for your Fellowship.

Our Facilitator Philosophies

While our perspectives as a team differ, our main facilitation priorities are:
- Critical and humanizing pedagogy
- Developing community by prioritizing relationships
- Process over product
- Engaging the participant as an expert
- "We are allergic to boring!"

" *I think understanding (through the teaching philosophy activity) that who I am as an educator is very similar to who I am as a person and what I believe about the world was really cool.*

- 2023 EOP Faculty Fellow

Troubleshooting Instructional Challenges

Objective

There were a couple of instructional challenges within our Fellowship that seem to be relatively common to either the fellowship model or integration of the EOP Framework itself. This page outlines those challenges and provides our solutions.

Activity

➡ Consider the challenges and solutions outlined below with your team. Evaluate how you might address them for your Fellowship or within your university context.

Challenges	Solutions
• Because faculty are busy and have limited academic capacity, they often need more than intrinsic motivation to participate in the Fellowship.	• We supported our Fellows with relationships, time to work, teaching strategies, and an honorarium. We focused on removing barriers so they could do quality work.
• Faculty feel that sustainability doesn't "fit" into their discipline or that they don't have time to integrate additional material or modules and cover ABET standards.	• There are a wealth of guides on the EOP website that help faculty integrate sustainability in every class! We also worked on shifting the mindset from sustainability being an "add on" to being integrated into every topic.
• The Framework can be overwhelming because of its length and thoroughness. Faculty felt that it was nearly impossible to integrate the whole Framework into every class.	• We underscored that our expectation was to *start* to use EOP in their classes, not fully integrate it. We also encouraged faculty to choose a few learning outcomes to focus on.
• Teaching schedules and other commitments made it difficult to get all of the Fellows together at one time.	• We paired down our "in person" events to the essential workshops and moved much of our work into hybrid or virtual spaces. We offered mutliple sessions of the same material.

Worksheet

Your One Minute Why

Reflection Space: _____

_____

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_____

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_____

Informal Assessment

Objective 1: _____

    Informal Assessment Approach: _____

Objective 2: _____

    Informal Assessment Approach: _____

Objective 3: _____

    Informal Assessment Approach: _____

Worksheet

Program Objectives

_____

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Internal And External Support

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Grounding Framework

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Program Outlines

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Team Members

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ASU EOP Fellowship Review

Working Retreat

Left: Dr. Joshua Daymude reviews the EOP Framework.
Right: Dr. Ryan Milcarek discusses notes that other Fellows have left about the EOP Framework.

We hosted our initial programmatic workshop on January 30th and 31st, 2022 at the Desert Botanical Gardens, and encouraged faculty to spend time reflecting on their work in the outdoor space. Our objectives for the workshop were to introduce the EOP Framework to the faculty and set expectations. While the first night of the workshop focused on building relationships and creating context for the Fellows, the second day used active learning practices to introduce them to the EOP Framework.

Setting Expectations

Our work is centered in humanizing and critical pedagogy, and we communicated those values through our workshop design. We focused on relationships through offering communal meals and space for collaboration. We offered rest by giving faculty opportunities to wander in the garden and step away from their screens to engage in authentic communication.

We encouraged the concept of "process over product" by not dictating what the Fellows had to produce, but rather introducing them to the EOP Framework and allowing them to create materials that work best for their classrooms. Our strategically designed activities set the tone for the rest of the Fellowship, which facilitated an environment in which Fellows were eager to engage with the program leads and each other. One fellow noted, "it's always amazing to me how calmed, hopeful, and encouraged I feel after our EOP meetings."

Fellows had time to build relationships and learn from each other throughout the program.

Agenda

On the first evening of the workshop, invited our new Fellows to explore the garden before we began any programming. We then had the program leads participate on an hour-long panel in which they discussed how they got involved with the EOP Framework and what their expectations were for this program. We also took this time to discuss any questions the Fellows had about the program. After dinner, Co-PIs Carberry and Karwat (who had integrated the Framework into their classes using a pilot grant) spent the hour describing their work, which allowed the participants to get an idea of how they might engage with the Fellowship.

After reviewing the Framework, Fellows discuss their notes on how they might integrate it into their classes.

On the second day, Fellows enjoyed breakfast together and had discussions about their teaching philosophies for the first hour. Faculty then spent an hour individually annotating the EOP Framework using sticky notes. They posted those notes on large sticky note pads, with one pad being designated for each of the topics. Fellows then spent an hour with the large sticky notes, reviewing what their colleagues had posted, adding new notes, reorganizing them, and writing on the pads. After lunch and an opportunity to walk outside, the faculty were given two hours to revise their content to incorporate the EOP Framework. The day ended with an hour of lightning talks, in which the Fellows had a brief window to share their ideas with their colleagues.

Outcome

Faculty were excited by the Framework and how they could strengthen their teaching through its use. They developed strong relationships with each other and the program team, which facilitated their continued engagement with the program throughout the entirety of the program. We did find that faculty struggled to grasp the entirety of the Framework and apply it to their classes, which is a challenge we addressed through COP meetings and the Reflection Workshop.

> *Working with colleagues across the various engineering disciplines has really helped me visualize how the framework can be integrated in many areas.*
>
> - 2023 EOP Faculty Fellow

Reflection Workshop

Rationale

Allison Wolf leads the Fellows as they work through the EOP Evaluation Tool.

After a semester of implementation, we hosted our Reflection Workshop on July 28, 2023. This workshop reviewed the participants' curricular development from the last semester and refined material for the next. In order to do this, we created the EOP Evaluation Tool. We also invited Dr. Roneisha Worthy from Kennesaw State University, who provided helpful perspectives about EOP use in her own work.

Considering the EOP Framework through the Evaluation Tool allowed us to address questions of depth and breadth. Many of the Fellows felt that unless they were incorporating all of the learning outcomes or using them to their full extent that they were not utilizing the Framework. This workshop helped the Fellows get a better understanding of their current and future practices. This workshop demonstrated that incorporating the Framework should be an iterative process, which will continue to pay dividends long after the culmination of this grant.

Agenda

The first item on the agenda was the EOP Integration Reflection, providing an opportunity for participants to collectively reflect on the effectiveness of integrating the EOP framework into their classrooms in the past semester. We spent thirty minutes on this. Afterward, the focus shifted to the EOP Evaluation Tool. The Fellows spent an hour using the tool and considering how they had integrated the Framework over the semester. This tool helped in reevaluating the courses and reflecting on how to improve the curriculum in the future.

The morning continued with Dr. Worthy's presentation, which offered valuable insights and knowledge sharing about her experiences. In half an hour, Dr. Worthy clearly communicated EOP's importance in her work.

Dr. Worthy shares about the impact of the EOP Framework with staff from the Engineering Learning and Teaching Hub.

After Dr. Worthy's presentation, we provided an hour for Fellows to revaluate the course using the EOP Evaluation Tool. Some Fellows spent time working independently on their course design to help it more closely align to the EOP Framework, while others met in small groups with other Fellows or the facilitators to get help.

One of the biggest challenges we faced that was difficult to get all of our Fellows in one place at the same time because of their busy schedules. To address this issue, we hosted a half-day workshop that offered the same session in both the morning and afternoon of the same day. In order to help develop the Fellowship community, we provided lunch in between the two sessions and invited all the Fellows.
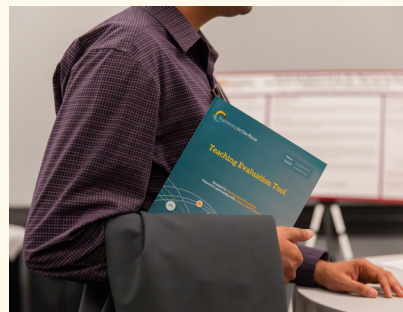
The EOP Evaluation Tool

The EOP Evaluation Tool was created to help faculty consider the ways in which they are currently incorporating the EOP Framework by evaluating each learning outcome within the nine topic areas and its relevance to their courses.

You can access the latest iteration of the EOP Evaluation Tool by visiting the Engineering for One Planet website.

Drs. Enrique Vivoni and Sydney Schaefer discuss the EOP Evaluation Tool.

Outcome

The faculty developed a better understanding of the use of the EOP Framework in their courses and created a plan for the implementation of the learning outcomes in the upcoming semester. Our iterative use of the EOP Evaluation Tool allowed faculty to clearly identify areas in which their courses could incorporate more of the EOP Framework, so the workshop culminated in the creation of new material for their courses. The faculty implemented their revised work in the Fall 2023 semester and showcased it at the final Fellowship Celebration.
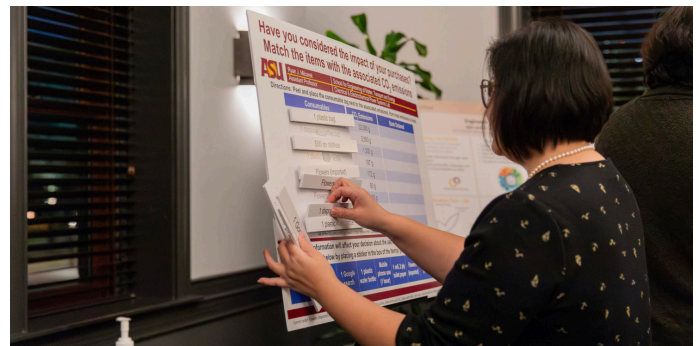
Final Celebration

Rationale

The Final Celebration provided an invaluable platform for Fellows to showcase the culmination of their year-long projects and reflect on their collective journey within the EOP program. This event allowed Fellows to highlight their contributions and also fostered a dynamic exchange of ideas, offering insight into the diverse range of initiatives undertaken by their peers. Additionally, many Fellows extended invitations to faculty colleagues, which gave us the opportunity to spread understanding of EOP further across the university.

Fellow Archana Shashidhar Mysore discusses her work with the EOP Framework with other Fellows and guests.

Dr. Haolin Zhu engages with a poster presentation from Dr. Milcarek that explored carbon consumption.

Spreading The Word

We asked Fellows to invite a colleague to come learn more, and received excellent feedback! Our faculty guests were excited to see the Framework and wanted to utilize it in their classrooms after seeing others design excellent lessons.

We also invited partners who are doing similar work at universities nationwide to join us, both to encourage their work and to foster potential partnerships centered around the EOP Framework.

Drs. Bridget Wadzuk (Villanova University) and Roneisha Worthy (Kennesaw State University) discuss Fellowship design.

Agenda

Before guests arrived, the EOP Fellowship cohort convened to review their journey using the EOP Evaluation Tool, considering how they had used the EOP framework in their curriculum and what impact it had on their classes. They spent an hour as a cohort reflecting on their experience and the lessons they had learned.

They then gathered for a dinner with faculty guests and partners from other universities before engaging with the community in a gallery-style presentation where they showcased the culmination of their year-long efforts. Engaging in discussions, the Fellows exchanged insights and reflections gleaned from their collaborative efforts at the EOP program.

Drs. Haolin Zhu and Amy Trowbridge chat about their experiences over the Fellowship.

Co-PI Darshan Karwat and Dr. Lynn Robert Carter celebrate his efforts through the program.

Outcome

This event represented not only an opportunity to celebrate the challenging work that the Fellows have done over the course of the year, but also to generate excitement about the EOP Framework both at ASU and across the network. The presentations were truly reflective of the unique faculty members. Some brought student work examples, others brought graduate students who had centered their class assignments around the EOP Framework. One faculty member co-presented with a high school teacher that introduced the Framework at a high school level. Many of the faculty guests expressed interest in an opportunity to do the Fellowship, demonstrating that they viewed the work they had seen as valuable and transformative in the educational space.

Community of Practice

Rationale

Communities of Practice (CoP) allow for a variety of important activities over the course of the Fellowship. First, they promote the development and maintenance of relationships which busy schedules may not typically permit. Second, they provide a space to discuss topics of interest within the community and contribute to knowledge sharing. Finally, they allow program facilitators to build the content of the Fellowship in response to participant interest. For example, the Fellows expressed interest in learning new assessment tools during the working retreat, so we as facilitators were intentional with ensuring we made it a large topic of discussion during the CoP meetings.

Topics

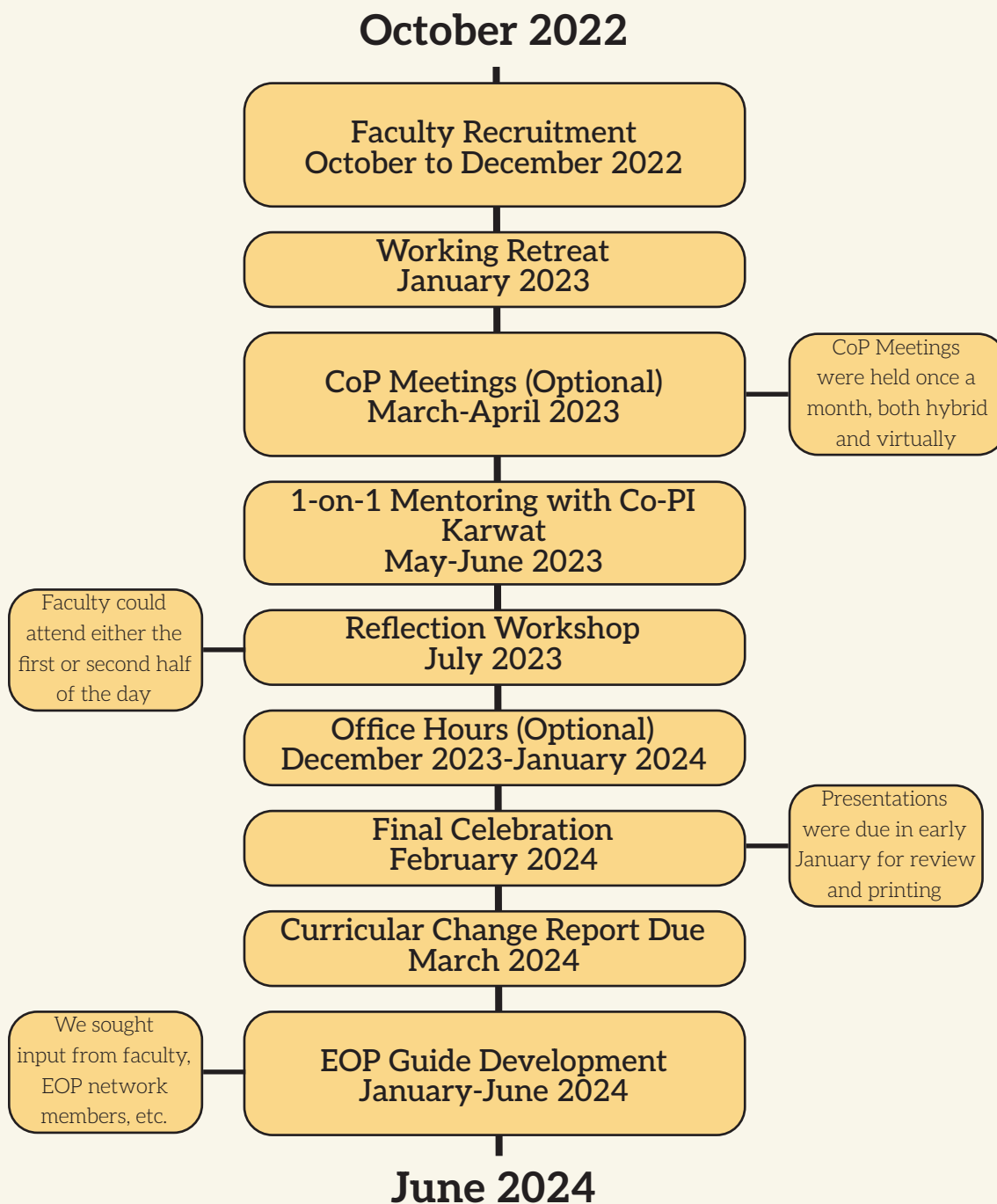| Month	Topic
March	**Collaborative Working**
April	**Siemens and Sustainability**
September	**Gamifying Teaching**
October	**Assessment Tools & Strategies**
November	**Final Celebration Preparation**
December	**Office Hours**
January	**Office Hours**

Utilizing The EOP Community

There is a wealth of knowledge within the Engineering for One Planet Network! Utilizing the EOP community outside your home institution can provide valuable insights. We reached out to a variety of people that could add their knowledge of engineering and the EOP Framework, and everyone was excited to share their amazing work. The Fellows valued connecting with guest speakers from different universities and corporations as they benefited from the unique perspectives they offered.

Outcome

The CoP meetings allowed us to have consistent check ins with the Fellows, which was vital for the maintenance of the program. One challenge that we repeatedly faced was that the Fellows were very busy and never had a time in which they could all meet. While we never developed a perfect solution, one approach that had some success was planning the meeting at different times each month. We also offered one-on-one appointments and office hours for Fellows that needed informal opportunities to engage with us as facilitators.

Timeline

October 2022

Faculty Recruitment
October to December 2022

Working Retreat
January 2023

CoP Meetings (Optional)
March-April 2023

CoP Meetings were held once a month, both hybrid and virtually

1-on-1 Mentoring with Co-PI Karwat
May-June 2023

Faculty could attend either the first or second half of the day

Reflection Workshop
July 2023

Office Hours (Optional)
December 2023-January 2024

Final Celebration
February 2024

Presentations were due in early January for review and printing

Curricular Change Report Due
March 2024

We sought input from faculty, EOP network members, etc.

EOP Guide Development
January-June 2024

June 2024

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Lessons Learned

Working Retreat

It was critical to set the tone of the Fellowship by hosting the first workshop off campus and providing ample time for reflection. Because we focused so much of our time on creating a authentic environment, faculty were receptive to novel ideas about sustainability education and teaching approaches, although we should have spent more time providing a baseline understanding of sustainability. We wish we could have utilized the EOP Evaluation Tool at the first workshop so that we could have had a consistent measure of integration. We also should have spent more time emphasizing that Fellows did not have to integrate the whole Framework into their course content.

Reflection Workshop

Hosting the same workshop twice worked incredibly well, and served as a valuable solution for the busy faculty. While the activities we did perform were valuable, it would have been nice to offer the Fellows more direct work time.

Community Of Practice

While we started the program trying to run these in a hybrid format, we quickly learned that faculty are just too busy (and, in ASU's case, too spread across multiple campuses) to meet regularly in a singular location. Ultimately, we found that virtual CoP meetings and in person workshops was the best solution for our needs.

Virtual Office Hours

This was a fantastic solution for connecting with faculty during a very busy time of year. We could connect with faculty that needed support in developing their presentation for the final celebration without adding another appointment to the calendar for those who felt confident in what they wanted to share. We also utilized Calendly during the summer months to help organize one-on-one mentoring meetings, which took a lot of the organizational pressure off of us while continuing to provide support opportunities.

Final Celebration

It was vital to invite faculty from ASU as well as partners from other universities. They were so excited to see all of the work our Fellows had done, and that enthusiasm set a positive tone.

Other Thoughts

While the PI team was invaluable in their advisement and support of this program, faculty often asked for more teaching examples and mentorship. Fortunately, there are now many guides on the EOP website to direct faculty to!

References

Cashion, M. (2024). Critical sustainability: Critical professional development for sustainability education. (Publication No. 3114226) [Doctoral dissertation, Arizona State University]. ProQuest. https://www.proquest.com/docview/3034899446/AC33BD3488CD4629PQ/1?accountid=4485&sourcetype=Dissertations%20&%20Theses

Freire, P. (2018). Pedagogy of the oppressed. Bloomsbury.

Kohli, R, Picower, B., Martinez, A., Ortiz, N. (2015). Critical professional development: Centering the social justice needs of teachers. International Journal of Critical Pedagogy, 6(2), 7–24.

The Lemelson Foundation (2022). The Engineering for One Planet Framework: Essential Sustainability-focused Learning Outcomes for Engineering Education (2022). Cynthia Anderson and Cindy Cooper (Eds). The Lemelson Foundation, Portland, Oregon, USA. 28 pages.

Owen, J. E. (2016). Fostering critical reflection: Moving from a service to a social justice paradigm. New Directions for Student Leadership, 2016(150), 37–48.

Salazar, M. (2013). A humanizing pedagogy: Reinventing the principles and practice of education as a journey toward liberation. Review of Research in Education, 37(1), 121–148.

Engineering for One Planet

Prepared by **Sustainability Teachers' Academies at Arizona State University**
Powered by **The Lemelson Foundation**

ASU

ARIZONA STATE UNIVERSITY