People-First Engineering: A College-wide effort to shift the culture by using the socially engaged design process

Heidi M Sherick (Faculty Development and Leadership Specialist)

Dr. Heidi Sherick has worked in higher education for over 30 years with experience working in a variety of administrative roles including academic affairs, student affairs, and alumni affairs. Currently, Heidi is the Director of Leadership Development in the College of Engineering at the University of Michigan. She provides one-on-one coaching for faculty and staff in new executive leadership roles and Associate level faculty in Engineering; facilitating career advancement, fostering connections, and providing leadership development opportunities. Heidi served as the Assistant Dean for Undergraduate Programs and Diversity in the College of Engineering at Montana State University from 2001-2012 and was the Director of EMPower, the engineering minority program. Heidi earned her PhD in Educational Leadership from University of Nebraska-Lincoln. She studies developmental relationships in higher education and investigated the processes through which higher education leadership is fostered including mentoring, coaching, role-modeling, sponsoring, and networking.

Pauline Khan (Director)

Tershia A. Pinder-grover (Director of CRLT in Engineering)

Dr. Tershia Pinder-Grover earned a B.S. degree in Fire Protection Engineering from the University of Maryland and M.S. and Ph.D. degrees in Mechanical Engineering from the University of Michigan. She joined the Center for Research on Learning and Teaching (CRLT) at the University of Michigan in August 2005 and became the director of CRLT-Engin in 2016. In this role, she leads a team focused on advancing engineering education in the College of Engineering (CoE) through innovative programming, strategic partnerships, and cultivating individual relationships. In collaboration with the Associate Deans in the CoE, she provides leadership on educational priorities, especially as it relates to Diversity, Equity and Inclusion. She also works closely with department chairs to create customized programming to meet the needs of their faculty. Her current research interests focus on the adoption of inclusive teaching practices for engineering instructors.

Deborah Mitchell Covington (Director of Partnerships, Outreach and Retention)

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INTRODUCTION

As engineers, we seek to solve large societal challenges that affect a diverse society. Excellence in engineering thus requires improvements in diversity, equity and inclusion. The lack of diversity in engineering contributes to inequitable outcomes due to, in part, the biases that we all have. Hence, we put forth the idea of education for all at our engineering college as a means to counter those biases and develop excellent engineers who can contribute to the solutions of our society's big challenges. In our approach, five community teams were established to develop proposed plans on DEI education, starting with a focus on race and ethnicity, for all students, faculty, and staff at the college. It was one of the most far-reaching DEI efforts at a college of engineering. The plans were developed over one year, grounded in the literature around DEI and input from our community.

This lessons learned paper will focus on the faculty and staff initiatives initiated at the University of Michigan, a large, public Research 1 institution, in the College of Engineering. This paper also emphasizes the important factors needed to map this effort to the socially engaged design process (SEDP) (https://csed.engin.umich.edu/socially-engaged-design-process-model), a design process that considers broad contexts through an equity-centered lens that includes social, cultural, and other contextual factors (See Appendix A). It includes five stages: explore, define, ideate, develop, and realize. The paper will highlight the basic model of the process, the practices faculty developers implemented, and the specific way the SEDP can be applied for organizational change around diversity, equity, and inclusion during ASEE's "Year of Impact on Racial Equity" and beyond.

Communication, calibration, and consistency were key to alignment as we reflect on the process. In addition, as committees were composed (See Appendix B), there was an intentional effort to diversify their composition, allowing for representation from job roles, faculty rank, and departments. Critical to the process was the active reflection and analysis of power, privilege, identity and motivations while the work was happening. Similarly, we used critical questioning expertise to bring clarity to the problem, add context, and generate ideas. This is similar to other problem-solving techniques; however, the coupling of the reflection and purposefulness made the socially engaged process more robust, especially in the context of anti-racism education programming efforts.

For the SEDP, reflective questions at key junctures in the process include:
- Whose voices or perspectives are missing?
- What assumptions might we be making that are influencing the way we are defining the challenge?
- Are we allowing our own bias or love of a particular idea to influence the process?
- Is there further stakeholder engagement, ideation, or prototyping to be done (what are we missing)?
- What might we need to revisit to ensure equity is centered moving forward?

Each section below highlights the specific phase from the general model of the socially engaged design process (SEDP) and how that phase was mapped to our culture shift efforts around anti-racism education programming through an equity-centered lens at Michigan Engineering. The lessons learned are shared throughout the paper with a summary at the end.

EXPLORE PHASE
In the general model of the SEDP, specifically in the Explore phase, designers ask questions and gather information. For example:
- What individuals and organizations affect or are affected by the problem?
- How have people historically attempted to solve these problems?
- Where can you look for the root causes of the problem or challenge?
- What information would be helpful in better understanding the context of this challenge?
- Whose voices are included vs. excluded?

Faculty and staff feedback began by soliciting input about the content and structure of programming through surveys. Participation was strong with 135 faculty responses (20% response rate) and 490 staff responses (63% response rate). Data were also collected from peer institutions which included best practices, incentives, communication plans, and racial equity education content or training efforts. The lesson we learned from this phase is the intentional designing of questions for all audiences which honors the iterative process of reflection, reflexivity, and inquiry.

DEFINE PHASE
In the Define phase, the data collected in the Explore phase converge with the context to help identify next steps. For our project, we conducted a faculty mini-retreat, a series of small group discussions, and several one-on-one meetings between subcommittee members and faculty. Concurrent with survey administration, a protocol was developed to facilitate faculty and staff conversations (individual interviews, small and large group discussions) and to capture this feedback. Using this structure was an important lesson learned because it created a uniform process to collect feedback and a tool to support committee members who may have been less experienced at collecting qualitative data. The protocol (See Appendix C) focused on motivations and concerns, but also asked faculty to describe an ideal DEI professional development program. These conversations incorporated a range of faculty perspectives as they relate to departmental affiliation, role/rank, and social identity categories. The customized approach allowed for multiple voices to be heard. This led to a qualitative evaluation of themes from faculty about key recommendations about the content and structure for continuing their education in diversity, equity, and inclusion.

The recommendations from faculty about their perspectives regarding continuing education fell into broad areas. Specifically, the faculty requested to include concrete approaches about how to interact with others, varied content from experts, and the expansion of topics beyond race and ethnicity. They also expressed the need for DEI as continuous learning or embedded practice rather than 'training.' From both faculty and staff, we received feedback about the preference for smaller group interaction and conversations facilitated by DEI experts in regards to racial inequity and other sensitive diversity topics.

The staff perspective was also garnered through qualitative methods such as "Creative Conversations" (groups of three individuals conversing with prompts about diversity efforts), and a staff town hall. The sorting of comments and analysis of patterns and themes helped guide efforts forward for recommendations. Committee members were also able to build on concepts that emerged through the process in an iterative way. The recommendations from staff mirrored many of the faculty suggestions. A distinguishing outcome from staff input was the resounding

preference that incentives (i.e. monetary, credit, certification), were not necessary to encourage engagement in DEI programs.

IDEATE PHASE

According to the SEDP, Ideate is the time to take learnings from the Define phase, revisit and examine possibilities that could potentially address the project needs. For our application, we asked steering committee members to review and reassess the recommendations by asking questions (See Appendix D). During these discussions, we answered questions, clarified terms and debated interpretations. We carefully listened to the responses of the steering committee to reflect on the ideas presented by members. For faculty, the steering committee and the curriculum committee met for a joint conversation about the recommendations. A similar conversation for staff recommendations occurred between the steering committee and the staff Diversity, Equity, Inclusion and Culture committee. Intentionally planning and engaging in these conversations are a lesson learned because this process improves communication, buy-in, and promotes transparency.

DEVELOP PHASE

At the core of the Develop phase, designers solidify and prototype a concrete solution or a path forward by incorporating "data, feedback from stakeholders, [and] secondary research." In our case, we focused on developing a continuing education framework that would be based on using all stakeholder data collected in the earlier phases as well as literature focused on DEI. Specifically, while the steering committee gathered feedback from faculty, the faculty curriculum committee concurrently was convened with the specific task to propose a continuing education program for all faculty (see Appendix B for committee structure).

Prior to analyzing the faculty perspectives, the curriculum committee began by reviewing and discussing the literature to gain a better understanding of best practices for applying DEI professional development that leads to lasting change. In addition, they invited speakers to attend their meetings who were scholars in this field or who have implemented school-wide DEI faculty development requirements to gain practical insights about pursuing this endeavor. The committee also considered frameworks for equitable decision making as well as inclusive teaching. Once the faculty perspectives were gathered using multiple methods, members of the steering committee presented this information to the faculty curriculum committee. This structure provided another layer to ensure the continuity of ideas in this work. Guiding Principles for the DEI programming were also derived from this strategy.

This strategy described above generated the following guiding principles, which are a significant lesson learned. These principles serve as the basis for the continuing education framework. The DEI activities should be opportunities for meaningful growth and reflection. It will be important to provide a choice of topics and methods in the DEI space to maximize engagement with the program. The curriculum committee members recognized that the education program introduced should *not* be a check-the-box approach in order to create a culture shift. The committee also recognized that a program of broad scope is needed in this institutional context to allow people at different levels of engagement with their DEI journey to benefit and grow from the program. The committee also noted that it will be important to position these programs as opportunities for a faculty member or staff member to improve their daily work flow, i.e., helping improve the practice of DEI in teaching, research, and service. An accountability mechanism has been integrated into the annual reporting for both staff performance reviews and the faculty activities

report where they are asked to reflect on the impact of their DEI contributions and engagement. The curriculum committee acknowledged the need to recognize those faculty who go above and beyond the minimum DEI requirement with an incentives structure. The incentives and recognition program is needed both at the individual and department level. Finally, continued evaluation of these efforts are necessary to refine this framework and maintain communication and buy-in.

REALIZE PHASE
In the SEDP, the Realize phase is purposely broad and allows for the realization of the design process to mean many things. According to the Center for Socially Engaged Design, "In some cases, through the development that happened in the last stage, you may *"realize"* that you need to revisit previous stages in the process, for more ideating, to redefine the problem, or perform further exploration."

For instance, one of several options in the continuing education framework is the intentional integration of bystander intervention for all constituent groups. In 2020, Change it Up! To Stop Anti-Black Racism (CiU! ABR) was introduced so that every member of the Michigan Engineering community (approximately 5,600 faculty, students and staff) would notice the problem of anti-Black racism, and take action to interrupt it. CiU! ABR introduces participants to the bystander intervention framework and four strategies to interrupt microaggressions. Additionally, they learn terms to enhance racial literacy and review a brief history of ABR in the U.S.

A key critical element of this initiative, and lesson learned, is that the deans and department chairs completed the workshop and then championed the efforts for their department. Department Chairs and Directors were asked to recommend faculty and staff to serve as CiU! ABR workshop facilitators, 24 facilitators were trained, nine of which were faculty members. By completing nine hours of rigorous training, including topics such as ABR history and theory, and bystander intervention skill development, facilitators are better equipped to intervene when individuals are targets of microaggressions, and prevent the social harms that may result. CiU! ABR facilitators surpass "not being racist", and have become *anti-racism allies* actively working to eradicate prejudice, discrimination and bias in their spheres of influence by modeling appropropriate responses to inappropriate behaviors. Of the 660 Michigan Engineering faculty, 42% (275) completed the CiU! Workshop. We learned from post evaluation surveys when we asked workshop participants "what actions they would take as a result of this workshop," some commented about using their new education to improve their courses by asking students to call out if they say or do something that is a perceived microaggression. Other themes included integrating workshop content into their courses, stronger support for URM students, and the desire for more education on the topic.

Plans are underway to create a CiU! Series to teach skills for interrupting anti-Asian and anti-Latinx racism and allows participants opportunities for in depth learning on racial microaggressions, practice bystander intervention strategies, and write their own scripts to interrupt harm.

CONCLUSION

In order for progress to be made towards diversity and equity, we must be intentional through purposeful work that in itself is equitable and inclusive. Like most processes, an iterative flow benefits the outcome by allowing for adjustments and input. The application of the SEDP allows for a scaffolding for the iterations, adjustments, inclusions, and intentionality of equitable endeavors. Our lessons learned are peppered throughout this paper because of the iterative process of the socially engaged design model. Additional lessons learned include: the importance of common language, having the upper administration go first, (modeling the way), and creating allies (the use of peers). Thoughtful intention was put into language used by the committees' charges, to the composition of committee membership, to community engagement, and through communication with stakeholders. The process itself cannot be underestimated as we work to make culture change. This is an evolving challenge that we embrace as an on-going process. Part of the challenge is the measurement of success and establishing metrics.
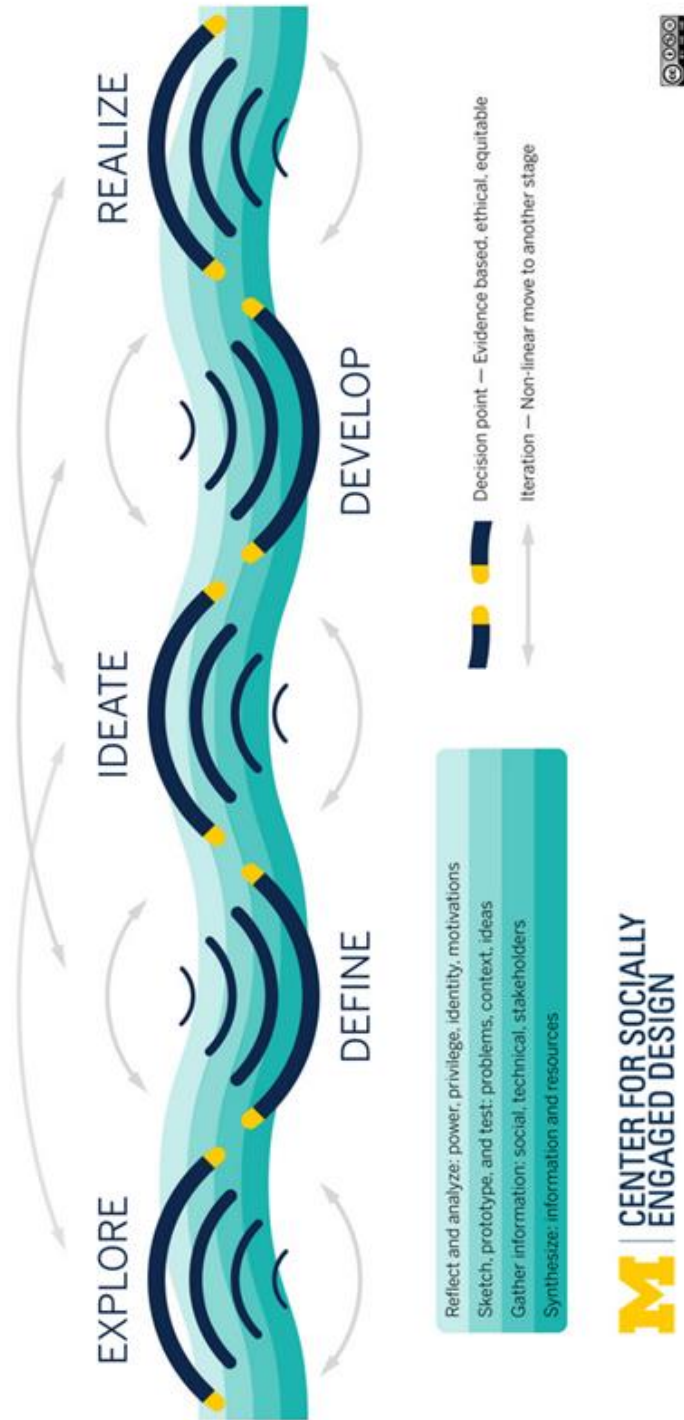
Appendix A Socially engaged design process framework
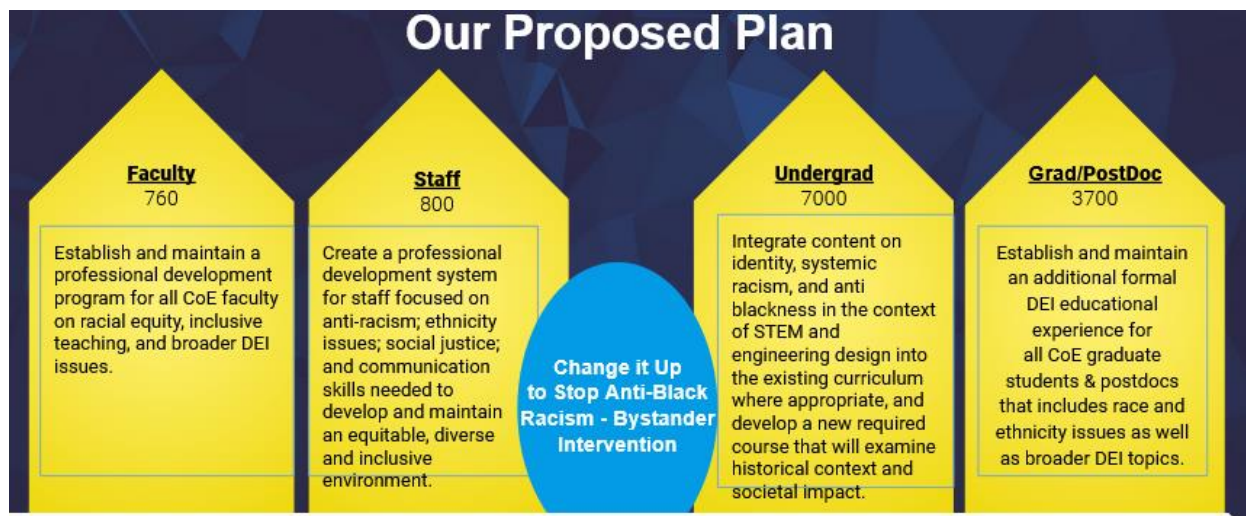**Center for Socially Engaged Design (2020). Socially Engaged Design Process Model.**
Available at: https://csed.engin.umich.edu/socially-engaged-design-process-model

SOCIALLY ENGAGED DESIGN PROCESS MODEL.

In the socially engaged design model, we organize the process like this:

EXPLORE

DEFINE

IDEATE

DEVELOP

REALIZE

Decision point — Evidence based, ethical, equitable

Iteration — Non-linear move to another stage

Reflect and analyze: power, privilege, identity, motivations

Sketch, prototype, and test: problems, context, ideas

Gather information: social, technical, stakeholders

Synthesize: information and resources

CENTER FOR SOCIALLY ENGAGED DESIGN

Appendix B Committee Structure

The college-wide efforts had a structure of five main teams, four focused on constituent areas and one focused on bystander intervention. For the purpose of this paper, we are mainly focused on the faculty committee efforts with some highlights from the staff committee and the bystander intervention committee which highlights the Realize Phase of the SEDP. The faculty team efforts described in this paper are referred to as the steering committee. There were several subcommittees that focused on the development of the faculty survey and the development of the protocols for the faculty discussion groups. Another faculty committee, the curriculum committee, was newly created and led by the faculty director of DEI, to develop the framework that would be approved by the college's executive committee.

With the staff team there were also subcommittees formed to divide the work. These subcommittees included: education content subcommittee, assessment and tracking subcommittee, and creative conversation subcommittee. Like the faculty steering committee much of the work from this effort was vetted by existing college committees for staff including: the Staff Diversity, Equity, Inclusion and Culture committee as well as the Staff Professional Development Committee who served in an advisory capacity for the effort.

Appendix C Moderator Guide

**Moderator's guide for race, ethnicity, unconscious bias
and inclusion education**

A CoE Steering Committee has been created to develop a plan for professional development and continuing education to support faculty on the topic of race and ethnicity. As an initial part of this process, the committee would like to gather feedback from multiple sources to help to inform their decisions. During this meeting/focus group/interview, you will be provided with background information and broad plans about the initiative. We value your honest feedback about the proposed plans, your suggestions, and any concerns that you might have. This information will then be reviewed by the Steering Committee and the Faculty Curriculum Committee to guide them as they develop detailed plans.

Background information about the initiative (Adapted from the College 5-year strategic plan)
We feel very strongly that, at our College, the job of creating a more diverse, equitable and inclusive community rests not within one organization or group of people, but with all of us. This summer has sharply exposed the disparities in our society, and the continued systemic racism and bias in our country that have long led to violence against our Black citizens and a lack of equal opportunity.

We will be building a framework to ensure **every member of the engineering community** is educated about issues of diversity, equity and inclusion, beginning with a focus on race, ethnicity and unconscious bias. We will also **maintain and expand pipelines and pathways** to become successful engineers and leaders, and **create tools** to ensure the campus is more inclusive and equitable.

To that end, we will be launching two major initiatives this year, and one of them will be to work towards launching **sustained, pervasive education** around issues of race, ethnicity, unconscious bias and inclusion **for everyone in engineering** – students, faculty and staff – **within one year.**

We have the beginnings of a plan for all community members to receive ongoing, sustained education, and to incorporate it into their daily lives as employees, students and engineers. We have assembled a number of community teams to develop five proposals to bring DEI education and awareness, with an initial focus on race and ethnicity, to all persons in the College community, including undergraduate, graduate, and postdoc students, as well as faculty, staff, and the community at large.

1. Materials for participants to review
The College is proposing a college-wide initiative to shift the DEI culture. Details about the proposed plan can be found at the College 5-year strategic plan (**link included when shared with faculty discussion group moderators**).

View (link included when shared with faculty discussion group moderators) the DEI Community Teams Overview Presentation

The goal is to establish and maintain a continuing education program for all College of Engineering faculty on racial equity, inclusive teaching, and broader DEI issues.

2. Questions for moderator to ask
  - What would motivate you or your colleagues to want to participate in an annual DEI professional development expectation tracked in FARS with an initial focus on anti-racism?

  - If you were to design the ideal professional development program for you and your colleagues, what might it look like?

  - What concerns do you have about the College instituting an annual DEI professional development expectation tracked in FARS with an initial focus on anti-racism?

 3. Gather the participant data and feedback (and place data at this link)

Moderator notes for a short session (2-4 participants),
10 minutes, or 1:1 meeting

As a moderator, your primary goal is to focus on gathering feedback from the attendee or attendees. Consider providing the materials to the participants in advance of the gathering, but still provide time to visit/revisit the materials during the meeting, You may use the following language to state the goals of the session.

Hello, we are _____. A College Steering Committee has been created to develop a plan for professional development and continuing education to support faculty on the topic of race and ethnicity. As an **initial** part of this process, the committee would like to gather feedback from multiple sources to help to inform their decisions. During this meeting/focus group/interview, you will be provided with background information and broad plans about the initiative. We value your honest feedback about the proposed plans, your suggestions, and any concerns that you might have. This information will then be reviewed by the Steering Committee to guide them as they develop detailed plans.

Please begin by asking each individual to introduce themselves and then by establishing some guidelines.

- We value your honest feedback and would like to hear from all participants.
- Empathy and humility are essential characteristics needed both for the eventual program itself as well as this initial visioning process. Therefore, we ask you to respond to the greatest degree possible with these traits in mind.

During the session,
- Help the participants focus on the goals.
- Identify a specific subtopic or a theme and ask participant(s) to expand on their thinking.
- Highlight the diversity of perspectives and encourage thoughtful engagement of different viewpoints, but encourage participants to expand on their thinking and/or to ground their positions in facts and evidence whenever possible.
- Prompt people to share their experiences.
- Some possible word 'stems' to use to direct the conversation are:
    - We really value your input.
    - We really want your guidance.
    - The goal is to develop a continuous learning education plan.
    - The conversations allow us to learn how to improve the classroom environment and the departmental culture.
    - The education helps us to improve the sense of belonging for all students and faculty.
    - Your input helps the College better understand the direction that we should take, Could you please clarify, expand, or share more about….?

FAQ GUIDE

Q: What if I am asked about whether the professional development work will be a requirement?

A: At this early stage, our goal is to collect honest feedback from faculty. The details about the requirement are still under evaluation.

Appendix D Sample Ideate Questions
Examples of questions to ask stakeholders during the Ideate phase

- How did the process go?
- Did you have any surprises?
- What are some key lessons learned?
- Was the information clear?
- Were there any changes you would hope to see?
- What else, if anything, would you want to see in the documents?
- What additional recommendations might you add?