Addressing New ABET General Criteria Focusing on Diversity, Equity, and Inclusion

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Introduction

In fall 2021, ABET released proposed changes to the General Criteria for accrediting engineering programs, including (a) definitions for diversity, equity, and inclusion (DEI) and (b) changes incorporating a basic grasp of these concepts to the curriculum (Criterion 5) and faculty (Criterion 6). While some may see the explicit inclusion of DEI as a radical revision of ABET criteria, a historical perspective shows that the proposed new requirements are an incremental reform stemming from a steady evolution of ABET's integrating professional skills into accreditation criteria. Over two decades ago, ABET Engineering Criteria (i.e., EC2000) for the first time included professional skills, intended to address the demands for interpersonal skills and global awareness among 21st Century engineers (Shuman, Besterfield-Sacre, & McGourty, 2005). In fact, a greater number of EC2000 a-k Student Outcomes pertain to professional skills than technical skills. This is even more the case in the current (1-7) Student Outcomes Criteria (ABET, n.d.). ABET's reasoning behind including professional skills in Student Criteria in EC2000 is equally applicable to ABET's current proposed inclusion of DEI elements into the General Criteria:

> [To promote undergraduate engineering students'] ability to function on multidisciplinary teams, understand professional and ethical responsibility, communicate effectively, understand the impact of engineering solutions in a global societal, environmental, and economic context, recognize the need for and be able to engage in lifelong learning, and understand contemporary issues (Shuman et al., 2005, p. 41).

Anticipating the approval of the proposed DEI-related changes in early 2023, a group of 20 institutions, led by Pennsylvania State University (PSU), gathered in October 2022 to brainstorm the strategies and challenges of integrating DEI into undergraduate engineering programs. The event drew 71 participants organized into 19 teams (primarily grouped by institutional affiliation). Before the three-day convening, teams submitted a draft version of their plans to address the changes proposed by ABET as well as the results of an institutional inventory of their DEI resources. Throughout the workshop, teams further developed their plans and gave feedback to and received feedback from at least two other teams.

In this paper (written from the perspective of the external evaluators, with contributions from members of the planning team), we identify common issues across institutions related to the implementation and assessment of DEI that might be navigated collaboratively based on document analysis and participants' survey responses. Specifically, we discuss the challenges and supports commonly expressed by event participants. Additionally, we present a set of recommendations that might help institutions strategize and implement action plans addressing the incorporation of DEI in ABET Criteria 5 and 6.

Background

DEI Plans in Engineering Academic Settings

With the increased acknowledgment that engineering lacks racial/ethnic diversity (rooted in issues of inequities, access, and social injustices), many engineering schools and departments over the past decade have begun developing and implementing DEI plans. Notably, the 2017 ASEE Deans Diversity Pledge garnered over 200 signatures of Deans who have committed to:

- Articulate the definition and the vision of diversity and inclusiveness for the institution;
- Assess their institution's need or justification and provide a statement of priorities and goals;
- Commit to equity, implicit bias and inclusion training across the school, and
- Define accountability and the means of assessing the DEI plan

(See https://diversityrecognition.asee.org/background/)

The ASEE Diversity Program (ADRP) was created to catalyze the aims of the Diversity Pledge and to recognize those institutions that make progress in achieving their DEI goals at the 'bronze,' 'silver,' and 'gold' levels. Among other elements, the ADRP submission guidelines require the inclusion of a DEI plan, along with a narrative situating the institutional context, progress, and outcomes of implementing the plan. To date, the ADRP has gone through four recognition cycles, inducting 131 institutions at the bronze level, with thirty-one of those institutions noted as exemplars—the silver level is being reviewed now; gold guidelines have not been developed.

Incorporating DEI into ABET General Criteria for Engineering

In March 2021, the Deans of twenty Schools and Colleges of Engineering signed a letter to ABET leadership, supporting the integration of diversity, equity, and inclusion (DEI) in the General Criteria for accrediting engineering programs. The letter stated, in part:

> *We believe that DEI are core values for all engineers, and essential considerations for generating creative and effective solutions to the most important challenges facing our society and our planet.*

In late October 2021, ABET released proposed changes to the General Criteria that include DEI and opened a comment period that lasted through June 2022. On October 29, 2022, the ABET Engineering Delegation Area approved definitions and proposed changes to Criterion 5 and 6 to be piloted for the 2023-24 and 2024-25 accreditation cycles (table 1 summarizes the proposed vs. approved changes). As stated on their website, ABET anticipates that the "Engineering Area Delegation will determine, based on the feedback received from the pilots and on the advice of the EAC [Engineering Accreditation Commission], the content of the adopted criteria."

Table 1. Proposed vs. approved changes to General Criteria 5 and 6.

Criterion	Proposed change	Approved change
5 Curriculum	d. content that respects the institution's mission and the program educational objectives and that ensures awareness of diversity, equity, and inclusion for professional success.	d. content that ensures awareness of diversity, equity, and inclusion for professional practice consistent with the institution's mission.
6 Faculty	The program faculty must also demonstrate knowledge of applicable institutional policies on diversity, equity, and inclusion and demonstrate awareness appropriate to providing an equitable and inclusive environment for its students that respects the institution's mission.	The program faculty must demonstrate awareness and abilities appropriate to providing an equitable and inclusive environment for its students, and knowledge of appropriate institutional policies on diversity, equity, and inclusion.

About the Big Ten ++ DEI Summit

In anticipation of the aforementioned changes, Dr. Justin Schwartz, Dean of the College of Engineering at PSU, spearheaded an effort to bring Big Ten ++ leaders together to brainstorm by institution and collectively the strategies and challenges of integrating DEI in undergraduate engineering programs. The event, titled *DEI Summit: A Big Ten ++ Engineering Workshop*, took place on October 16-18, 2022, at the Penn Stater Conference Facility, University Park, PA. The DEI Summit was organized by the Leonhard Center for the Enhancement of Engineering Education team, with Dr. Sarah Zappe, Director, leading the effort. The authors of this paper represent a subset of event organizers from the host institution and the external evaluation team.

A total of 71 participants attended, comprising 19 teams from 20 institutions (see Appendix A for a list of participating institutions). The overarching goals of the meeting were to

A. improve participants' understanding of the proposed ABET DEI criteria, and
B. promote teams' progress in formulating strategies for institutionalizing DEI in their engineering programs.

The Summit was organized as a workshop. Before the convening, teams completed a preliminary version of their DEI Strategies Plan, identifying plans to address the proposed changes to ABET Criteria 5 and 6. In addition, the teams conducted an internal audit of the resources that were available at their institutions to promote DEI efforts. Throughout the workshop, teams had the opportunity to develop their plans. During two sessions, teams were paired with other teams to review and discuss one another's DEI Strategy Plan. The detailed Summit agenda is available at: https://www.engr.psu.edu/equity-inclusion/dei-summit-22.aspx.

Methods

The DEI Summit was a milestone event, not only for participating institutions but for all U.S. engineering institutions accredited by ABET. As the external evaluators, we sought to identify common issues across participating institutions related to DEI strategies, implementation, and assessment that might be experienced by engineering schools nationally. Specifically, we asked,

- *What challenges and supports do teams anticipate will affect implementation of DEI ABET Criteria 5 and 6? What challenges and supports are most commonly expressed?*
- *In what ways can participant institution leaders best support DEI initiatives within and across institutions?*

Data used to address these questions were collected via pre- and post-versions of teams' Strategic Planning templates, as well as exit survey items that asked for two challenges and two takeaways, and responses to a third item asking, *What issue(s) were not addressed* at *the DEI Summit?*

The event organizers provided the Strategic Planning template (see Appendix B) to all participants two weeks before the Summit. The template was intended to be a working document for teams to (a) gather resources about their institution and to complete reflection activities before the summit, and (b) continue building throughout the summit. Specifically, the template walked participants through the proposed ABET DEI criteria, then asked teams to list current ideas related to curriculum and faculty strategies at the program, department/college, and/or institutional level. The template asked about existing resources/structures, the environment for making DEI changes, anticipated challenges, and institutional or other resources. Data from pre- and post-templates were summarized as a list of strategies mentioned across all plans.

An online exit survey was deployed during the final session of the Summit, with follow-up emails to ensure that those who left the meeting early had an opportunity to respond. The survey garnered a 75% response rate. Survey responses were analyzed using descriptive and inferential statistics. Open-ended items were analyzed using conventional qualitative techniques through which dominant themes were identified and summarized. All data were collected following IRB regulations.

Results

Pre-/Post Strategic Plans

Fourteen institutions submitted Pre-Work Strategic Plans. At the time of data analysis (three weeks after the summit), twelve institutions had submitted post-workshop strategic plans. Of these, eight appeared to be prepared as presentations to an audience within teams' institutions. Nearly all incorporated the Summit worksheet format, indicating that the worksheet effectively

structured teams' planning and discussion. Several teams' identified particular courses targeted to include DEI content to address Criterion 5 (Curriculum). A range of strategies was identified for addressing Criterion 6, faculty awareness and understanding of DEI, and in some cases, capacity to teach DEI content. Some institutions have included DEI requirements in their promotion and tenure process. Some plans addressed assessment in purely structural terms (e.g., minutes of faculty meetings that address DEI, assignments, course syllabi, and grading rubrics). Two included specific indicators (e.g., assignment results based on rubrics of DEI projects).

We noted that post-summit strategic plans were more fully elaborated than the pre-plans and were also more specific. We observed that strategies seen at this stage were focused on the *structures* by which DEI content will be conveyed to students—e.g., first-year courses, capstones, new courses, modules in existing courses, general education courses—and to faculty, e.g., annual retreats, DEI certificates, communities of practice, and tenure and promotion criteria. Noticeably absent were descriptions of the nature of the *content* that will be covered in courses and in promoting faculty awareness and capacity, as well as the *metrics* by which successful implementation and outcomes will be evaluated.

Anticipated Challenges in Meeting ABET DEI Criteria

Attendees were asked to identify up to two challenges in implementing Criterion 5 (Curriculum) and two challenges in implementing Criterion 6 (Faculty). We combined the 173 responses to open-ended questions because several challenges appeared in both Criteria (see Figure 1).

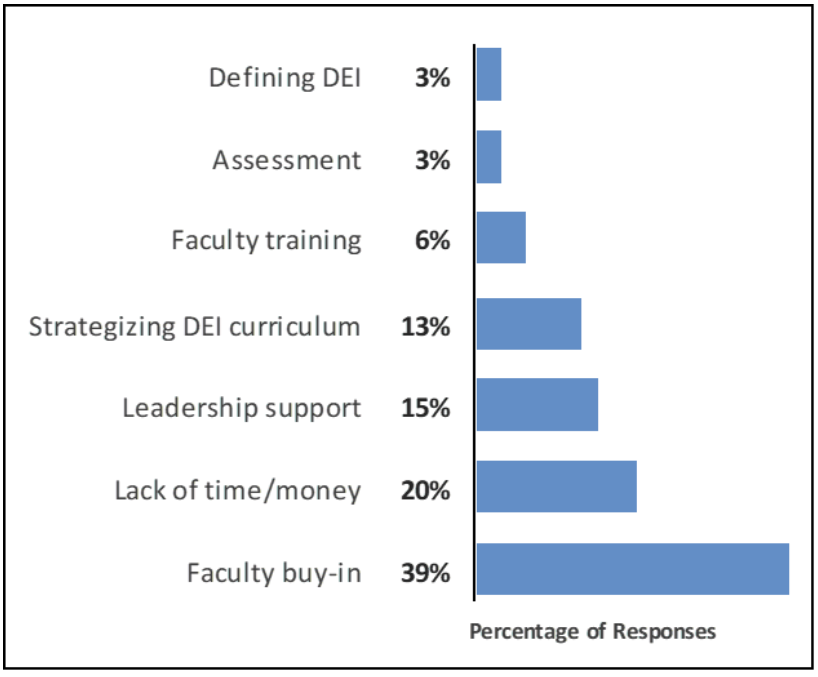

Figure 1. Challenges listed in meeting ABET DEI criteria (n=173)

Concerns about *faculty buy-in* (39%) topped the list. The next most-voiced concern was *lack of time and/or money* to implement changes (20%). *Leadership support* was the third most-expressed challenge. Several challenges were binned into *leadership support*, including:

- Communication across programs
- Coordination across courses and programs
- Scaling and sustaining DEI strategies
- Effecting a culture shift

Although challenges that fall under *leadership support* are diverse, meeting each challenge falls primarily to administrators at the Dean level or higher. Representative responses include:

- *Unclear whether all programs in college will be on board with implementing a coordinated plan. This will impact the extent to which we can make broad changes and set broad expectations.*
- *Scaling programs to all undergrads*
- *Who is responsible for leading this process?*
- *Faculty "bought in", but can't justify the effort because it doesn't affect P&T*
- *Lack of communication about DEI initiatives and progress*
- *Difficulties with implementing consistent policy or communication across departments*
- *Who is coordinating and holding people accountable?*

Challenges relating to *strategizing the DEI curriculum* focused most often on finding room in the curriculum for DEI courses or content, as reflected in this comment: "*The curriculum is tight already, so there's not much wiggle room for making changes."* Several respondents were concerned about the need for a "curriculum overhaul," either by adding new courses or new content to existing courses. Other challenges pertained to the scope of DEI content and scale of implementation:

- *Achieving critical mass of DEI content so that these concepts are embedded, not 'tacked on'*
- *Our ethnic studies general education requirement is not reinforced well in engineering courses, so students compartmentalize DEI — and frankly so do some faculty.*
- *Ensuring that we have enough coverage in each department*
- *Do we focus on college-wide core courses? Do we make incremental change? Do we focus on content in classes first or do we focus on how content is delivered?*

Remaining challenges—*faculty training, assessment,* and *defining DEI*—were raised by 3%-6% of respondents. *Assessment* was mentioned often during the Summit, both within teams and in a large group setting, but rarely in post-plans. We hypothesize that *assessment* and *faculty training* may be secondary concerns that will emerge with greater urgency once institutions confirm the means by which DEI will be delivered.

Discussion and Recommendations

Currently, the institutional focus has been on how DEI will be integrated into undergraduate engineering programs. Soon, leaders will need to determine the content that will be addressed and the expected outcomes. Many efforts are underway throughout the country. This effort could benefit from a cross-institutional conversation about core DEI competencies engineers should have to promote inclusive and globally aware practice. Suggestions for leaders seeking to institutionalize DEI competencies among their faculty and student bodies include:

(a) forming a cross-institutional committee to create a model DEI Framework that could be adapted and adopted by a diverse set of institutions,
(b) developing and sharing strategic plan templates,
(c) sharing examples of DEI assessments, and
(d) providing research-based strategies for institutionalization based on organizational change/transformation literature.

DEI encompasses a broad range of concepts, skills, qualities, and competencies. The extent to which curricular and faculty-focused criteria, requirements, and activities garner a critical mass of faculty who buy in will depend largely on how DEI is defined and operationalized. Defining and operationalizing DEI will be necessary to design, implement, and assess strategies. A cross-institutional *DEI Working Group* or committee could collaborate to develop one or more model frameworks that could be used as an example and/or could be adapted and adopted across institutions. Such a framework would operationalize DEI, the first step in designing evaluation metrics required for continuous improvement and ABET accreditation.

Providing research-based strategies for institutionalization based on organizational change/transformation literature could also be a charge for the above-mentioned DEI committee. A large body of research literature in engineering education and business documents challenges to organizational change. Yet success can be achieved, especially if institutionalization is baked into reforms from the beginning. Literature from research and practice provides guidance that can be codified and shared across a network of institutions seeking to meaningfully embed DEI into their institutional DNA (e.g., Kezar, 2015; Kezar, 2021; Watson et al., 2023).

Lastly, garnering faculty buy-in, which emerged as a challenge two times more often than the next most-cited challenge, is a pervasive and understandable concern. In addition to resistance from those whose values incline them away from DEI, there are those who may be inclined to support DEI but who are overwhelmed with continuing pressures and institutional restructuring due to budget cuts and COVID, not to mention other new initiatives to which faculty are expected to respond. For many faculty, DEI is only one more new thing that will require more course changes, more grading, and fewer resources before it gets eclipsed by the next new thing. These circumstances can apply to any number of reform efforts in higher education.

Skeptics might ask: *Is DEI worth the disruption and expenditure of time, money, and energy it will take to leverage institutional change?* To Summit attendees and to the authors of this

paper, the answer is an unequivocal “YES!” Yet, success of the initiative will depend on addressing the concerns of those who aren’t so sure because, in many schools and departments, that is the locus of the critical mass that will be needed to make a slow, inexorable cultural shift in engineering and society as well. Such a shift will be fueled by the DEI champions, whose collective knowledge, wisdom, enthusiasm, and commitment provide the vision and motivation to persevere in this worthy and timely cause.

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Appendix A: DEI Summit Participating Institutions

1. Carnegie Mellon University
2. Cornell University
3. Georgia Tech
4. Lafayette College
5. Massachusetts Institute of Technology
6. Michigan State University
7. Northwestern University
8. Ohio State University
9. Penn State
10. Purdue University
11. Rutgers University
12. University of California, Berkeley
13. University of Illinois, Urbana-Champaign
14. University of Iowa
15. University of Maryland
16. University of Michigan
17. University of Minnesota
18. University of Nebraska-Lincoln
19. University of Texas at Austin
20. University of Wisconsin-Madison
21. Vanderbilt University
22. Villanova University

Appendix B: Strategic Planning Template

Institution:
Team members and titles:
Program name (if applicable):

Step 1: Familiarize yourself with the DRAFT ABET Criteria

The definitions and criteria listed below have been approved by the ABET Engineering Accreditation Commission (EAC) but have not yet been fully finalized by ABET. While we do not expect the language to change significantly, there is a chance it may. ABET has developed definitions of diversity equity and inclusion, which are listed below. The pertinent language relating to Criterion 5 (Curriculum) and Criterion 6 (Faculty) related to DEI are highlighted in yellow.

Definitions provided by ABET:

Diversity is the range of human differences, encompassing the characteristics that make one individual or group different from another. Diversity includes, but is not limited to, the following characteristics: race, ethnicity, culture, gender identity and expression, age, national origin, religious beliefs, work sector, physical ability, sexual orientation, socioeconomic status, education, marital status, language, physical appearance, and cognitive differences.

Inclusion is the intentional, proactive, and continuing efforts and practices in which all members respect, support, and value others.

Equity is the fair treatment, access, opportunity, and advancement for all people, achieved by intentional focus on their disparate needs, conditions, and abilities.

Criterion 5 (Curriculum)

The curriculum must include:

a) a minimum or 30 semester credit hours (or equivalent) of a combination of college-level mathematics and basic sciences with experimental experience appropriate to the program.
b) a minimum of 45 semester credit hours (or equivalent) of engineering topics appropriate to the program, consisting of engineering and computer sciences and engineering design, and utilizing modern engineering tools.
c) a broad education component that complements the technical content of the curriculum and is consistent with the program educational objectives.
d) content that respects the institution's mission and the program educational objectives and that ensures awareness of diversity, equity, and inclusion for professional success.
e) a culminating major design experience that 1) incorporates appropriate engineering standards and multiple constraints, and 2) is based on the knowledge and skills acquired in earlier course work.

Criterion 6 (Faculty):

The program must demonstrate that the faculty members are of sufficient number, and they have the competencies to cover all of the curricular areas of the program. There must be sufficient faculty to accommodate adequate levels of student-faculty interaction, student advising and counseling, university service activities, professional development, and interactions with industrial and professional practitioners, as well as employers of students.

The program faculty must have appropriate qualifications and must have and demonstrate sufficient authority to ensure the proper guidance of the program and to develop and implement processes for the evaluation, assessment, and continuing improvement of the program. The program faculty must also demonstrate knowledge of applicable institutional policies on diversity, equity, and inclusion and demonstrate awareness appropriate to providing an equitable and inclusive environment for its students that respects the institution's mission.

Step 2: Create an Inventory of Institutional Resources

Please make an inventory of DEI resources and initiatives that already exist at your institution. Please complete the following table.

	Program-Level	**College-Level**	**University-Level**
Events, offerings, etc. already in place for **students**	*Example: World in Conversation Event offered in a first-year seminar*		
Events, offerings, etc. already in place for **faculty**			*Example: New Faculty Orientation*
Available resources (offices, individuals, trainings, etc.)		*Example: Office for Equity and Diversity for the College of Engineering*	

Step 3: Idea Generation and Reflection

1. The new criterion states that faculty need to "demonstrate knowledge of applicable institutional policies on diversity, equity, and inclusion." What applicable policies at your university should faculty be aware of?

2. Consider the curricula for your program. Where might there be natural fits for the new ABET DEI requirements to be included? Are there courses that already include elements of DEI? If so, to what extent are they integrated (i.e., are they part of the learning outcomes and assessed explicitly or are they included as extracurricular elements/resources)?

3. Consider required faculty events/meetings/retreats etc. your program or college holds. Where might there be an opportunity to introduce or expand on DEI to help meet the ABET requirements? Are existing opportunities currently evaluated?

4. What challenges do you think you will experience with implementing the new ABET criteria in your program?

5. What resources do you need to help to address these challenges?

6. What is the environment in your program regarding teaching and learning? What type of inclusive approaches could be used by your program faculty in various settings (i.e., teaching, advising, etc.)? What changes would you be able to make (or not be able to make) in your program to make your environments more inclusive or equitable?

Step 4: Community Crowdsourcing and Sharing

Beyond institutional-specific resources, what resources should the community of participants at the October DEI Summit be aware of to can help grow knowledge and ability relating to DEI (i.e., pertinent publications, available trainings, etc.)?

Step 5: Pre-Reading

We will provide a list of recommended pre-reading shortly. Stay tuned!