

Inclusive leadership development for engineers

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Abstract

This article presents a standards-aligned, strategy-driven leadership development model for equipping engineering students with skills to appreciate differences in the workplace and to collaborate and lead inclusively.

INTRODUCTION

Countless studies have examined the experiences of marginalized and traditionally excluded individuals over the last three decades, intending to increase the participation, persistence, and completion of Black, Latinx, and Indigenous people, White and Asian women, people with disabilities, and LGBTQIA+ persons in engineering. With billions of dollars spent, the result is a vast and comprehensive knowledge of the root causes of lack of participation and low persistence to degree completion. However, little, if anything, has markedly shifted the culture and climate of engineering schools and workplaces such that all people experience an affirming environment where they feel valued and welcomed. The problem is not the marginalized people; they are not broken and do not need to be fixed. The problem is the margin itself, and those who create it, uphold it and do nothing to change it. It is a collective responsibility to actively dismantle systemic, institutional, and interpersonal barriers that limit potential and teach others to do the same. By sending engineering graduates into the workforce without the knowledge, attitudes, and behaviors to change the culture and improve the climate for marginalized and minoritized people, engineering faculty and staff remain complicit in the systems that perpetuate exclusion and the resulting disparities.

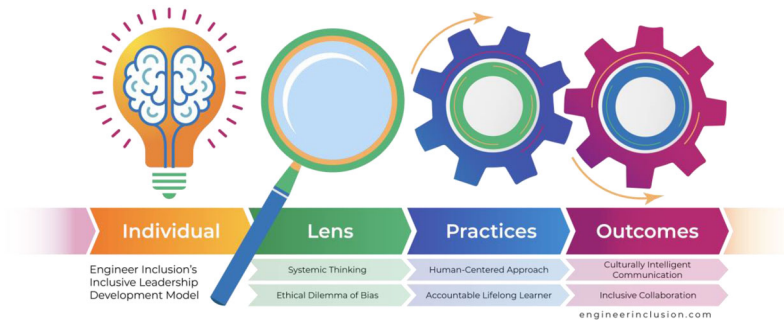
Engineering Leadership (EL) programming provides a focused opportunity to equip future engineers with the knowledge, attitudes, and behaviors needed to actively and intentionally contribute to diverse, equitable, and inclusive work environments. However, like professional skills (Shuman et al., 2005), educators often see diversity, equity, and inclusion (DEI) as outside the scope of the curriculum, and many people feel ill-equipped to facilitate and teach others DEI skills, as well as often feel at a loss to develop their own. This article presents Engineer Inclusion's inclusive leadership development (ILD) model, a guide for engineering educators in teaching themselves and their students to facilitate professional environments where everyone is valued and feels affirmed. To assist the reader, we provide a glossary of key terms (see Table 1).

The ILD model (Pollock, 2021b) aligns three frameworks, engineering habits of mind (Katehi et al., 2009), Accreditation Board of Engineering and Technology (ABET) student

TABLE 1 Glossary of key terms

Key terms	
Diversity	Diversity means a variety of race, gender, sexuality, (dis)ability, neurodiversity, or personality, to name a few distinctive identities. Diversity can be intersecting identities, different ways of knowing and doing, and cultural norms and values
Equity	Equity is the dismantling of systemic and institutional barriers and giving people what they need to succeed to level the playing field
Inclusion	Inclusion is the practice or policy of providing equal access to opportunities and resources for people who might otherwise be excluded or marginalized
Hidden curricula	In contrast to the formal curriculum intentionally taught, hidden or null curricula are the unofficial, unwritten, (often) unintended lessons, values, cultural messages, and perspectives that one learns tacitly
Inclusive leadership	Inclusive leadership is a set of leader behaviors that focus on facilitating group members feeling part of the group and retaining their sense of individuality while contributing to group processes and outcomes

From "What Vocabulary Do I Need to Know Related to Diversity, Equity, and Inclusion?", by Pollock (2021a), Engineer Inclusion. <https://engineerinclusion.com/what-vocabulary-do-i-need-to-know-related-to-diversity-equity-and-inclusion/>. Copyright 2022 by Engineer Inclusion. Reprinted with Permission

**FIGURE 1** Engineer Inclusion's inclusive leadership development model

outcomes (ABET, 2020), and the traits of inclusive leadership (Bourke & Espedido, 2019) that yields four components (see Figure 1): (1) understanding the self, (2) developing a DEI lens, (3) establishing DEI practices, and (4) desired DEI outcomes. This conceptual model provides a method for teaching inclusive leadership that aligns with standardized engineering outcomes and makes visible a pervasive hidden curriculum that perpetuates disparities within engineering. Using the four ILD components as the backbone, the article will briefly describe the model, why the components are critical to EL, and strategies for integrating each component into the classroom. For more strategies and resources, visit engineerinclusion.com/ild.

ORIGIN OF THE INCLUSIVE LEADERSHIP DEVELOPMENT MODEL

The burgeoning trend of inclusive leadership is an approach that stands apart from more classic leadership theories. Drawing on momentum, the ILD model is an amalgamation of

both theory and practice. The Randel et al. (2018) framework conceptualizes inclusive leadership as “a set of leader behaviors that are focused on facilitating group members feeling part of the group (belongingness) and retaining their sense of individuality (uniqueness) while contributing to group processes and outcomes” (p. 191). Their theoretical framework identifies leader behaviors for each category. First, inclusive leaders facilitate belongingness by supporting group members, ensuring that justice and equity are part of each member’s experience, and providing opportunities for shared decision-making on relevant issues. Secondly, inclusive leaders indicate value for uniqueness by encouraging diverse contributions to the workgroup and helping group members offer their unique talents and perspectives to enhance the group’s work.

Belonging and being valued are fundamental human needs. People need to perceive that they are a valued member of a team and experience treatment that satisfies their needs for belongingness and uniqueness in the workplace (Shore et al., 2011). Inclusive leadership helps address these two crucial needs and enhances performance, collaboration, attendance (Bourke & Espedido, 2019), and reduces turnover (Nishii & Mayer, 2009).

So what does inclusive leadership look like in practice? Bourke and Espedido (2019) conducted a study to identify traits or behaviors that distinguish inclusive leaders from others:

1. *Visible commitment*: Inclusive leaders make diversity and inclusion a personal priority and publicly assert an authentic commitment by challenging the status quo and holding others accountable.
2. *Humility*: Inclusive leaders are modest about capabilities, admit and are accountable for mistakes, and create the space for others to contribute.
3. *Awareness of bias*: Inclusive leaders demonstrate a consciousness of personal blind spots and flaws in the system. They strive to ensure they award people’s efforts and contributions appropriately.
4. *Curiosity about others*: Inclusive leaders exhibit an open mindset with a deep and non-performative interest in others. They listen without judgment and, with empathy, seek to understand those around them.
5. *Cultural intelligence*: Inclusive leaders are attentive to others’ cultures and adapt environments, policies, events, and so forth to be intentionally welcoming and respectful of all cultures.
6. *Effective collaboration*: Inclusive leaders empower others, thoughtfully activate the diversity of thinking, assess psychological safety, and focus on team cohesion.

The six traits may distinguish inclusive leaders, yet they are critical skills and awareness for which anyone should strive. The question that remains, however, is how inclusive leadership fits within EL. Pollock (2021b) examined two frameworks for standardized outcomes in engineering education aligned with DEI to address the challenge.

The 2020–21 ABET (2020) student outcomes describe what students from accredited institutions are expected to know and can do by the time of graduation. These relate to the student’s acquired knowledge, skills, and behaviors as they progress through the program. Summarized, they are: (1) solve complex engineering problems, (2) apply engineering design, (3) communicate effectively, (4) recognize ethical and professional responsibilities, (5) collaborate, (6) think critically and analytically, and (7) be a lifelong learner. Number five details an explicit mention of inclusion: “ability to function effectively on a team whose members together provide leadership, create a collaborative and *inclusive environment*, establish goals, plan tasks, and meet objectives” (ABET, 2020, p. 5–6). ABET’s mention

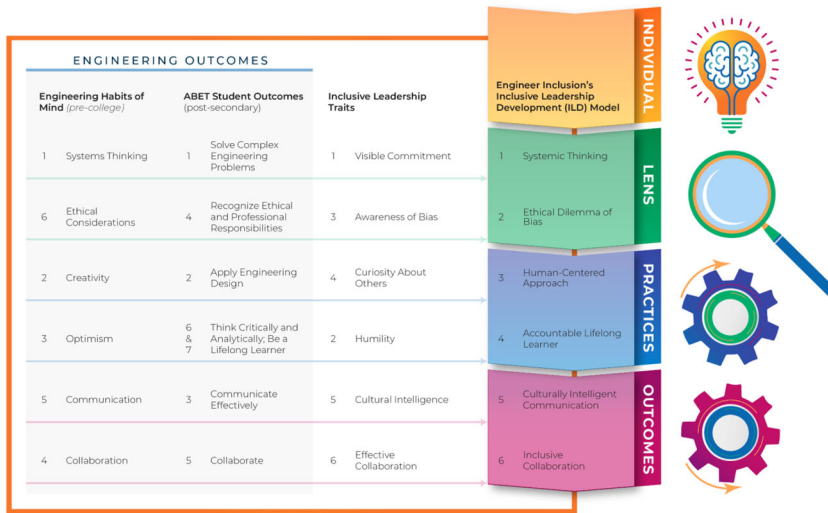


FIGURE 2 Aligned frameworks that yield the Engineer Inclusion ILD model from “*Inclusive Leadership Development*,” by Pollock (2021b), *Engineer Inclusion*. <https://engineerinclusion.com/ild>. Copyright 2022 by *Engineer Inclusion*. Reprinted with permission

of creating an inclusive environment suggests this is not just an abstract but a responsibility engineering faculty should be prepared to demonstrate and teach.

In the 2009 National Academy of Engineering report, *The Status and Nature of K-12 Engineering Education in the United States* (Katehi et al., 2009), the authors aimed to envision what K–12 engineering might look like in the future. They set forth three general principles, the result of a comprehensive commissioned analysis of pre-college engineering education research and practice. The third principle is: K–12 engineering education should promote engineering habits of mind. The six habits (AAAS, 1990) align with what many believe are essential skills for citizens in the 21st-century (Battelle for Kids, 2021): (1) systems thinking, (2) creativity, (3) optimism, (4) collaboration, (5) communication, and (6) ethical considerations.

By mapping the two engineering frameworks (ABET, 2020; Katehi et al., 2009) to the inclusive leadership traits (Bourke & Espedido, 2019), the outcome is a multi-part model for growth-focused inclusive engineering leadership instruction (see Figure 2). This congruence supports instructor capacity to prioritize the infusion of diversity, equity, and inclusion into their curriculum and chart a path towards an affirming environment for every student.

The ILD model has one more critical piece that appears visibly missing in the table of aligned frameworks (Figure 2): part 1, the individual, or understanding the self. In reality, it is ultimately the frame of the table itself and the foundation for which all work must occur. Individuals and their agency and awareness have also been found fundamental to other engineering leadership models (Kendall et al., 2018; Klassen et al., 2016).

PART 1: UNDERSTANDING THE SELF

Who one is, including all identities, lived experiences, life exposure, realities, truths, traumas, and thoughts, influence how one perceives everything in the world. All of these things

become a lens through which people filter everything. To be equitable and inclusive leaders, one must understand how their identities inform and bias their perceptions. Recognizing the power of the personal lens means understanding one's positionality, the social and political context that creates one's identity, and how one's identity influences and biases their perception of and outlook on the world (Jacobson & Mustafa, 2019). Positionality affects research, teaching, leading, policymaking, as well as everyday interactions (Hampton & Reeping, 2019; Secules et al., 2021).

As an example, consider how positionality can affect teaching, starting with the syllabus. Preparing a course and designing a syllabus can be a daunting task; however, once completed, faculty often use it over and over, with minimal changes from year to year. Some professors take great care in providing a detailed outline of what the student should expect, what they expect as the instructor, what they will do in the course, and what they want students to gain from the course. After years of honing a syllabus, one might think they have left nothing out. However, instructors make choices to leave lots of things out, either intentionally or unintentionally. They prioritize the content and curriculum based on what they think is most important. Thus, the excluded curriculum is assigned a tacit value of being less important (Gin et al., 2021). Codes of conduct, institutional policies, and program standards are similar. Thus, whether it is a syllabus, research plan, program, or team, the choices made send powerful messages about what is valued or not.

When we operate as we have always done, without teaching new skills and having higher expectations for inclusion, the hidden curriculum is that the status quo is okay. In doing so, we remain complicit in upholding the systems of oppression that have historically marginalized and excluded people from engineering (Bowen et al., 2020). The cost of not taking action is immense, and the work starts with examining the self. Without understanding ourselves and how our personal history, culture, values, and ideologies influence every aspect of our lives and interactions, we cannot see blind spots and discover growth opportunities (Banaji, 2013).

Strategies

- Invite students to examine their positionality. Download a free resource at <https://engineerinclusion.com/what-is-positionality/>.
- Assign students to read the *Harvard Business Review* article, "Why Inclusive Leaders Are Good for Organizations, and How to Become One" (Bourke & Espedido, 2019) and have them reflect on and discuss how they think they can improve to become more inclusive leaders.
- Incorporate reflection activities with explicit questions about how one's gender, race, ability, or any other intersection of identity might be an advantage or disadvantage in a situation or collaboration.
- Create a culture of feedback in your classroom that holds space for helping each other learn to see and examine blind spots.

PART 2: DEVELOPING A DEI LENS

Learning our positionality requires us to consider privilege, and you cannot fully understand systems of advantage without also learning about systems of oppression. Consequently, the first two components of the ILD are deeply intertwined. Part 1 looks in, and

Part 2 looks out, consisting of two key elements: systemic thinking and ethical dilemma of bias.

While the second component is labeled a lens, it is more accurately a way of thinking or looking at the world. There is no magical lens we can pick up to instantly have Superman's x-ray vision into the systems around us. Developing a DEI lens is a process of honing knowledge, expanding awareness, and making adjustments to alter perspectives. An inclusive leader's lens allows them to:

1. See and consider how systems of oppression and advantage influence their decisions and impact their team.
2. Examine intersectionality (the interconnected nature of social categorizations that can create overlapping and interdependent systems of discrimination or advantage).
3. Investigate how interpersonal and institutionalized bias produce an ethical dilemma that one must address (Grossenbacher & McGlamery, 2014).

Examining the hidden curriculum in engineering provides a contextual lens to comprehend the stubborn exclusion of certain people groups (for example, Black and Brown people and people with disabilities) (Karanxha et al., 2014). In contrast to the formal curriculum that educators intentionally teach, hidden or null curricula are the unofficial, unwritten, (often) unintended lessons, values, cultural messages, and perspectives that students tacitly learn. Engineering students that grasp the latent signals about their unwanted presence tend to exit early (switching majors) or assimilate to dominant cultural norms for survival (Holly, 2018). As one develops their DEI lens, they see these outcomes as rooted in systemic issues and as a profoundly ethical dilemma when considering the personal and economic impacts on the marginalized and minoritized.

Strategies

- Always use diverse people, stories, and ways of knowing and doing. Intentionally de-center dominant cultures and expand knowledge and awareness.
- Ensure the ethical dilemma of bias is part of all ethics discussions.
- Introduce the four I's of oppression: ideological, interpersonal, institutionalized, and internalized (Bell, 2013). Do not allow the reduction of broad conversations of bias to only interpersonal. Push students to think about the issues systemically.
- Teach root cause analysis as a tool to understand issues of inequity.

PART 3: ESTABLISHING DEI PRACTICES

Understanding oneself and developing a DEI lens is essentially useless unless one takes action to do something differently. As such, there are two crucial practices inclusive leaders must develop. The first practice, a human-centered approach, is a spin on the philosophy of human-centered design and design thinking, popularized by The Hasso Plattner Institute of Design at Stanford (d.School). Buchanan (2001) describes it as follows:

Human-centered design is fundamentally an affirmation of human dignity. It is an ongoing search for what one can do to support and strengthen the dignity of human beings as they act out their lives in varied social, economic, political, and cultural circumstances (p. 37).

Like the Stanford model leads with empathy, we must also intentionally lead with empathy, curiosity, and open-mindedness to strengthen the dignity of all humans around us.

The second practice is becoming an accountable, lifelong learner. The journey to becoming an equitable and inclusive leader is ongoing, fraught with mistakes and failures. Inclusive leaders are optimistic about the possibilities and opportunities to improve equity, access, and diversity. They are deeply reflective of personal and institutional actions and are committed to learning more about what they do not know. Finally, they are personally accountable for mistakes, failures, and mishaps (rather than deflecting, avoiding responsibility, and claiming good intent).

When we focus on inclusion as a practice, we remove institutional barriers, seek and celebrate diversity, and create a culture and climate that allows every person to be their true, authentic self and reach their full potential.

Strategies

- Try the expanding engineering limits concept (Steuer-Dankert et al., 2019) to engage students in deeper learning about ways an understanding of gender and other diversities within engineering culture could improve engineering practice and outcomes.
- Challenge students to creatively solve for equitable and inclusive solutions.
- Incorporate activities that encourage curiosity (and respect) of other ways of knowing and doing.
- Emphasize empathy as a crucial skill for engineering design and team culture (Walther et al., 2017).

PART 4: DESIRED DEI OUTCOMES

When we effectively incorporate the ILD elements into our ways of knowing and doing, we can expect two key outcomes: culturally intelligent communication and inclusive collaboration. However, both require a reflective and reflexive practice to revise our lens and improve our practices continuously.

If we are not culturally intelligent communicators in a global society, then we are not good communicators (Stoian, 2020). The same if/then can be applied to inclusive collaboration. By claiming we are good without the skills related to the adjectives of inclusive and culturally intelligent, we implicitly prioritize the dominant cultures (in engineering, those are White, male, heterosexual, Christian). Thus, the hidden curricula in that belief or teaching strategy are: that any other culture or marginalized population is unimportant.

Communication and collaboration both contribute to the environment. Inclusive environments show a direct impact on the academic and psychological growth of historically marginalized students. Specifically, inclusive classroom climates and equitable teaching practices improve persistence, academic and emotional development, and confidence among diverse college students (Cabrera et al., 1999, 2001; Colbeck et al., 2001). The consequences of inclusive environments result in changing discriminatory attitudes of all students (non-historically marginalized and historically marginalized). Inclusive classrooms enable positive academic and social interactions and develop an appreciation for diversity extending into the workplace (Bauman et al., 2005; Bennett & Sekaquaptewa 2014; Milem et al., 2005).

The familiar adage, the rising tide raises all boats, is valid for inclusive environments because they allow all people to authentically contribute their knowledge, skills, and tal-

ents. The rich combination of diverse perspectives, experiences, and backgrounds enriches the collectively shared environment, whether a classroom or a workforce team. Inclusive leaders are attentive to which voices and ways of knowing and doing are present, missing, or silenced and actively work towards diversity and inclusion.

Strategies

- Ensure culturally intelligent communication and inclusive collaboration are metrics for self, group, and instructor evaluations.
- Prompt regularly with: Whose voices are either missing or silenced? Why? What can we do?
- Show videos or host guest speakers who can talk about the critical importance of culturally intelligent communication and inclusive collaboration. Then, tying back to Part 2, discuss the ethical and professional responsibilities communication and collaboration play in the workforce.

CONCLUSION

If we wish to close the gaps and increase the participation of Black, Latinx, and Indigenous people, White and Asian women, people with disabilities, and LGBTQIA+ persons in engineering, we must create inclusive environments for them in the classroom and the workforce. To change engineering culture such that everyone feels affirmed and valued, we must prioritize diversity, equity, and inclusion and train future leaders with the skills to do so. Therefore, when we approach addressing the importance and absence of diversity, equity, and inclusion within engineering leadership curriculum through the lens of standardized outcomes, we can see that DEI is not something else to add. It is the hidden curricula that can be made clearly visible through the inclusive leadership development model.

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