NAE Forum on Proposed Revisions to ABET-EAC General Criteria on Student Outcomes and Curriculum

C. Diane Matt
WEPAN Executive Director

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Critique the Alignment of Proposed Criteria 3 and 5 Relative To:

1. Efforts to foster inclusiveness in engineering profession—Engineer of 2020
2. Entry level needs of the practice today—IBM, IDEO
3. Future expectations for BSEs—Forbes Insights and ASEE CMC Attributes of a Global Engineer
4. Forces: Technical, collaborative problem solving, intercultural sensitivity
1. Efforts to Foster Inclusiveness

Aspiration #6 of 10 - Engineer of 2020

“We aspire to an engineering profession that will effectively recruit, nurture, and welcome underrepresented groups to its ranks.”
Alignment with Aspiration to Welcome Underrepresented Groups? None

- Criteria 3 and 5 do not address any part of this aspiration.
- Engineering college cultures are rarely inclusive, often uncivil for those who are not straight, white, men.
- Biases--gender, race, social class, ethnicity, and national origin--permeates every node in the system: standardized tests; admissions practices; pedagogy; and student and faculty academic/ social culture.
Inclusion and Diversity: Much Effort, Mixed Results, Widespread Challenges

1. Medtronic: “NEED minority engineers in clinics.”
2. Chairs: “women are the best students—they leave.”
3. “Your students are a liability in my company.”
4. “In labs, the boys rip the tools out of my hands...”
5. “The prof won’t meet with girls—I bring a boy along.”
6. “There was a professor who called all the black women students by the name of the woman janitor. I will send no money until he is gone.”
7. “That faculty roast is full of firing offenses!”
2. Entry Level Needs Today: IBM and IDEO—“T-Shaped” Skills

T-Shaped Skills
Tim Brown, CEO IDEO

Jim Spohrer, Global University Programs IBM

Vertical
• Depth of skill-ability to contribute to creative processes

Horizontal
• Disposition for collaboration across disciplines
• Empathy, active listening, EQ
• Enthusiasm for, and ability to build on other’s ideas
Alignment with Entry Level Need for “T-Shaped” Engineers? Weak

• Criteria 3 and 5 have a primary technical focus.
• Criterion 4, “an ability to communicate effectively with a wide range of audiences” does not fully capture the importance of this competency.
• No mention of KSAs or disposition related to effective collaborative problem solving.
• “...able to participate in diverse, multicultural workplaces” is a low expectation and does not appear in the criteria themselves—just the preamble.
3. Future Needs Expressed by Industry: Global, Strategic, Inclusive, Diverse

Forbes Insight 2011, Global Diversity and Inclusion

• “Diverse and inclusive workforce is crucial for companies that want to attract and retain top talent.”

ASEE CMC Attributes of a Global Engineer

• 20 attributes; 5 groups:
  • Technical
  • Professional
  • Personal
  • Interpersonal
  • Cross-cultural
Alignment with Future Industry Needs
Global Cultural Competence? Weak

- The focus of future needs is global intercultural competency.
- The criteria have one only reference to global contexts.
- They do not envision preparing students for contributing to innovation and business performance in an inclusive, diverse, global, technical ecosystem.
Observations on Content

• Criteria 3 and 5 reflect a significant emphasis on technical outcomes over increasingly critical interpersonal and collaboration outcomes.

• Neither today’s employer needs for “T-shaped” knowledge, skills, abilities nor future needs for engineers who can contribute in a complex, global environment are addressed well.
Observations on Impact

• The proposed criteria do not articulate outcomes that will propel engineering programs to work toward preparing students for the needs of existing--or future employers. They appear to reflect 20- to 30- year old business environments.

• These criteria do not help ABET perform or contribute to its reputation as a far-sighted global leader in engineering education.

• The proposed criteria do not make sufficient forward progress to warrant adoption.
C. Diane Matt  
WEPAN Executive Director  
www.wepan.org  
www.wepanknowledgecenter.org  
dmatt@wepan.org  
303-871-4643