GUEST EDITORIAL

The Time is Now to Build a Culture of Wellness in Engineering

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Prior to the rapid onset of COVID-19, higher education faced a mental health crisis. The COVID-19 outbreak both created and exacerbated stressors for students, with early evidence suggesting that the pandemic has had a significant negative impact on student mental health. The response of the engineering education community to adapt instruction during the pandemic has demonstrated our ability to quickly adapt and reimagine engineering education to protect student physical health. What can we learn from the COVID-19 crisis to address mental health and prioritize student wellness? Engineering culture has been described as having ideals of toughness and hardship that may promote poor self-care. As we reimagine higher education after COVID-19, we have the opportunity to build a culture of wellness in engineering to support student mental health and wellness, shifting the narrative in engineering from one of suffering to one of thriving.

Before the outbreak of COVID-19, college campuses were facing a mental health crisis. Over the last decade, college student depression, anxiety, and suicidal ideation has been increasing (Duffy et al., 2019; Lipson et al., 2019). The rapid collision of the COVID-19 pandemic into this landscape undoubtedly exacerbated the mental health crisis, with concerning early evidence showing an increase in student depressive disorders (Chirikov et al., 2020). Simultaneously, in our response to combatting COVID-19, we have upended higher education, making dramatic changes to instruction, policies, and more within mere weeks to prioritize student physical health. Procedures and requirements that we've held tightly for years were "sacrificed in our sudden realization that public health is now our top priority" (Vanasupa, 2020, p. 354). These drastic changes and reprioritizations demonstrated our ability to redesign engineering education to promote community and student physical health. If we can redesign engineering education to promote student physical health, can't we do the same for student mental health? What can we learn from our response to the COVID-19 crisis to address the mental health crisis and prioritize student mental wellness? Given that culture permeates all parts of the engineering education ecosystem, I argue that shifting the culture in engineering is a first and necessary step towards addressing the mental health crisis. The cultural backdrop of engineering is defined by programs that are described as having "horrific" workloads (Godfrey & Parker, 2010, p. 12) in a "meritocracy of difficulty" (Stevens et al., 2007, p. 2). Students normalize and even celebrate poor self-care, where pulling an "all-nighter" is characteristic of a successful engineering student. Faculty commiserate about high stress levels from hundreds (or thousands) of unread emails and unrelenting manuscript and grant deadlines. As we reimagine higher education and rebuild in the wake of the COVID-19, we have an opportunity to disrupt this culture of high stress and poor self-care. By changing the narrative of engineering from one of "suffering and shared hardship" (Godfrey & Parker, 2010, p. 12) to one of wellness and self-care, we can promote student thriving in engineering (Ge et al., 2021).

Engineering Culture

Engineering is often described as unique compared to other academic disciplines. In 2010, Godfrey and Parker sought to define the cultural landscape of engineering education, identifying six cultural dimensions as part of the defined conceptual framework (Godfrey & Parker, 2010). One theme across faculty and student conversations identified by Godfrey and Parker was that of "hardness" that conveyed "worth and status" where "being able to take it" is a mark of success in the field (Godfrey & Parker, 2010, p. 12). Prior to COVID-19, research focused on undergraduate engineering students

measured high rates of mental health conditions and psychological distress (Danowitz & Beddoes, 2020). Our recent work prior to COVID-19 identified high levels of self-reported stress, anxiety, and depression for undergraduate engineering students (Jensen & Cross, 2021). Further, our work also suggests students even associate poor mental health with studying engineering, viewing it as normal and necessary in the discipline, with one student sharing "The engineering student life is stressful and sometimes detrimental to mental health" (Jensen & Cross, 2019, p. 2). Together, this work led us to propose the "engineering stress culture" that we believe is detrimental to student mental health (Jensen & Cross, 2021). What might be the implications for mental health of these ingrained cultural norms? Norms and expectations of high stress and poor self-care may impact students seeking help for mental health challenges due to the assumption that its normal and necessary. Recent work by Lipson and colleagues found that engineering students with a mental health concern were significantly less likely to seek help compared to students in other disciplines (Lipson et al., 2016). Discourse of the "brutally rigorous" (Jensen & Cross, 2019, p. 3) workloads and ideals of toughness (Godfrey & Parker, 2010) to survive the engineering curriculum dictate the expectation that high stress is pervasive and unavoidable, that those who cannot manage the high stress levels are not cut out for engineering. These narratives create a pressure to fit these expected norms and can further marginalize some students or lead students to accept that poor mental health is necessary to complete an engineering degree program.

Building a Culture of Wellness in Engineering

Changing the culture of our discipline from one of high stress to one of wellness could have far-reaching consequences. How might our recruiting efforts to engineering change? How would the public view engineers? How might we recruit more diverse students and faculty? Other disciplines have faced similar challenges of normalization of overwork and burnout. Medical training programs have increasingly implemented programs to foster cultures of wellness in response to high rates of depression and burnout (Edmondson et al., 2018). Similarly, employers have also recognized the value of workplace wellness and have developed wellness programs to lower healthcare costs and improve retention, among other desirable outcomes (Ott-Holland et al., 2019). Amaya and colleagues presented a call to action for a culture of wellness in higher education and described best practices and ongoing campus efforts to promote student health, writing that "universities must understand that every person impacts the well-being of the campus community" (Amaya et al., 2019, p. 36). In addition to health promotion, how can we first dismantle the idea that being stressed out is the socially accepted norm in engineering or necessary for success? How can we communicate to students that perpetual stress and fatigue are not only unnecessary, but not valued by our discipline? As educators, we should first consider how we convey norms and expectations to students. If I respond to emails at all hours of every day, what am I conveying to students about engineering or academic life? We should consider how we can model wellness and self-care to students, including setting boundaries for our work. And it's not only our actions that dictate these norms, but language that we use. We should resist dialogues of *surviving* and *weed out* courses and the notion that the pursuit of wellness comes at the expense of rigor. We can demonstrate wellness priorities to students by including mental health syllabus statements (Flaherty, 2017), sharing wellness resources and information on course websites, and integrating wellness into engineering curricula (Miller & Jensen, 2020; Paul et al., 2020). A culture of wellness in engineering will be built by the small acts of many instead of large sweeping changes by a few.

Conclusion

The mental health crisis in engineering requires immediate attention from the engineering education community. The COVID-19 pandemic provides an opportunity to reimagine higher education and redefine our values to those of wellness in engineering culture. Of course, any call for change in our education systems is daunting, with educators and administrators already facing difficult challenges before and after the COVID-19 outbreak. Some may argue that the necessity of upending higher education in response to COVID-19 is due to the infectious nature of the disease. Is high stress and poor self-care infectious? Maybe. Health studies have shown how one person's stress can be passed to an observer (Engert et al., 2014). The normalization and expectation of high stress and poor self-care can perpetuate in our academic programs, effectively spreading through student populations. By addressing the perceived norms of high stress and poor mental health, engineering may become a culture that supports and values wellness, which will improve the student experience and retention. Diminishing a culture of high stress may be particularly important for groups that already experience a diminished sense of belonging or a "chilly climate" (Hall & Sandler, 1982, p. 3) or "climates of intimidation" (Palmer et al., 2011, p. 501). A cultural shift may not require large, disruptive, and time-consuming changes to our educational programs. Structuration theory suggests that cultures are created through the micro-practices of individual members of a group (Giddens, 1984). How can we as educators change our micro-practices to begin this cultural shift? Duality of structure, part of structuration theory, explains that structure is "created from the top down and the bottom up"; that we validate and solidify structures when we follow them and allow them to influence our decision making (Tracy, 2019, p. 46). How can we break this cycle and foster a culture of wellness? To shift the culture in engineering, we must challenge ourselves daily to consider the impact and meaning of the language we use (Williams, 2020) and the ways we communicate value and norms. The culture of engineering is what

we, members of the community, define and practice, through our daily actions, and how we validate existing norms and structures through our own behaviors. As we navigate the COVID-19 pandemic and beyond, we will undoubtedly change numerous aspects of engineering education. In this new path forward, let us consider how our micro-actions are defining the culture of our engineering programs. A cultural change in engineering will require all members of our community, administrators, faculty, staff, and students, to work together to redefine and reimagine our values and structures that support all members to thrive. Let us rise to the challenge of this critical moment and redefine engineering as a discipline that celebrates both physical and mental wellness.

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Competing Interests

The author has no competing interests to declare.

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