

STRATEGIES TO INTEGRATE WELLNESS INTO THE ENGINEERING CLASSROOM

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INTRODUCTION

Undergraduate students report a variety of stressors during their degree programs including, but not limited to, academics, relationships, loneliness, finances, and transitions to university life.^[1, 2] As a result of these stressors, students experience high levels of stress during their education.^[3] This high stress can negatively impact academics^[4] and intention to remain in an academic program.^[5] Further, excessive or chronic stress can contribute to physical illness and other mental health challenges, including depression and anxiety.^[6] Therefore, reducing stress and helping students identify healthy ways to cope with stress are important in supporting student wellbeing and success.

Studies that have focused on engineering students report high levels of perceived stress compared to other disciplines^[7] and high levels of self-reported stress on clinical measures.^[8] Further, mental health can differentially impact students who are historically underrepresented in engineering including female,^[8-10] first-generation,^[8] Hispanic or Latinx,^[10] and gender-expansive students.^[9] Within chemical engineering, mental health distress has been linked to reduced motivation, autonomy, and competence in a materials and energy balance course, all of which resulted in a reduced final grade.^[11] Further, a study found that over 60% of chemical engineering students at one university struggled with anxiety during the academic year, and over 75% struggled with feeling overwhelmed.^[12] While mental health distress is not unique to chemical engineering students, these studies highlight the importance of chemical engineering faculty considering how mental health impacts the performance of students in their classroom.

As an engineering discipline, engineering workloads have been described as “horrific” where engineering programs are a “meritocracy of difficulty.”^[13] Engineering students report high workloads that leave little time for activities outside of academics, including prioritizing wellness.^[14-16] Previous work described engineering students’ expectations of high stress and poor self-care as necessary for success.^[17] This high stress environment may be seen to define engineering education and has been described as engineering stress

culture.^[8] Further, students recognize these norms in engineering and how stress can impact their mental health; this was described by a student in a recent study, “I know a lot of students who are constantly overwhelmed with school-work, including myself. A little bit of stress at times is normal and healthy but it’s different when that stress becomes anxiety that prevents you from living your life normally.”^[17] This “ubiquity of stress”^[18] has been hypothesized to reduce student mental health help-seeking, where students have reported maintaining a “suck it up” mentality until reaching a breaking point.^[19]

We argue that faculty play an important role in co-creating engineering culture and will be critical in dismantling the culture of stress that leads to student views of stress as normal and necessary. In a recent study, 81% of engineering faculty reported discussing difficulties coping with stress with undergraduate students.^[20] Despite faculty reporting a willingness to help students and expressing relative confidence in dealing with student stress,^[20] not all students feel that engineering faculty are empathetic to their experiences with stress and mental health. For example, recent qualitative studies with engineering students described their views of engineering professors as unsympathetic and unaccommodating to student mental health.^[18, 21] Taken together,

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these studies describe an engineering environment where students not only feel that high stress is expected, but also mental health is neglected.

In a recent article in *Chemical Engineering Education*, Wilson and Goldberg provided faculty with guidelines on how to identify and support engineering students who are struggling with their mental health.^[22] While we encourage faculty to learn and adopt strategies to support students in mental health distress^[22] and complete university and national mental health training programs, we see these as reactive efforts aimed at supporting students who are already struggling. Therefore, this article highlights proactive efforts that faculty can take to disrupt the narrative of “suffering and shared hardship”^[13] in engineering that emphasizes norms of high stress and poor self-care. We posit that proactive interventions that emphasize the benefits of wellness in engineering education will support the development of a culture of wellness^[23] that will change the narrative of “surviving in engineering” to “thriving in engineering.” Based on content presented during our workshop at the Chemical Engineering Summer School in 2022, we discuss ways to integrate wellness into the engineering classroom as a valuable tool to support engineering students. Ultimately, proactive interventions and preparation will help to normalize the prioritization of mental health in engineering and support student well-being and success.

SUPPORTING COMMUNITY

There is significant literature to support the link between sense of belonging and mental health in college students overall,^[25-27] as well as students who are traditionally underserved in engineering.^[28-30] Additionally, sense of belonging can impact motivation and enjoyment of their studies, factors that can significantly impact student persistence within a program.^[31] This sense of belonging can be supported through the development of relationships with peers but also through development of relationships with faculty members in engineering.^[32, 33]

Prior studies in engineering have highlighted the importance of students developing a support network of peers within their courses and major.^[13, 16, 34] Faculty can help facilitate these relationships, especially in early level engineering courses, by explaining to students the importance of developing these support networks. Relationship development can be further supported through encouraging the creation of informal workgroups within a course or through formal integration of team-based homework or projects. When integrating group assignments, it can be helpful to provide students with guidance on how to effectively work in teams and talk to them about how they can use their work in teams to help improve their knowledge of the course content. Importantly, research shows that development of relation-

ships that are more than just informational (i.e., sharing of course knowledge) results in better outcomes for students.^[35] Therefore, providing more sustained opportunities for student interactions can help students develop beneficial social relationships with their peers that go beyond the classroom. Further, faculty can encourage students to advocate for the students in their peer groups by understanding symptoms of mental health distress and the resources available to support students who might be struggling. Studies within engineering show that students would be more likely to seek help for their mental health if referred by a friend or peer. “I’d almost certainly be more likely to admit, ‘yeah, I’ve got [something] going on...,’ and then get help, especially if the friend specifically recommends seeking help.”^[19] Therefore, encouraging students to advocate not only for themselves, but *for their peers* can be especially important to improving help seeking within the engineering student population.

In engineering, faculty can be seen as unsympathetic or difficult to approach.^[18, 21] As a result, faculty who are intentional about combatting these negative expectations are often recognized by students as being supportive of their mental health. For instance, one study shared the experience of a student: “You can tell that she cares about her students as more than just students...she has been a very big advocate for being very mentally healthy and making sure that she acknowledges that this is not an easy major and that this class is not going to be easy.”^[21] Faculty-to-student relationships can be supported by increasing the quality of interactions with students through communicating that you are approachable and available, as well as showing students respect and empathy.^[36] Faculty can achieve this by sharing more about themselves in class and also working to get to know their students. One easy way to do this is through student surveys at the start of a course, where students are asked to share information about not only their career goals and course concerns, but also their interests and goals outside of class. This is a good way to get to know students and their motivations for taking a course and could allow faculty to highlight connections between student career goals and the content being covered in class. Faculty can also complete the survey themselves and share it with students. In doing this, students can start to see shared motivation, concerns, and interests that help them to build a relationship with their instructors.

MODELING WELLNESS THROUGH BEHAVIOR AND POLICIES

Stress has been described as “ubiquitous” in engineering.^[18] As a result, faculty can work to actively dismantle this engineering norm through modeling positive mental health in the classroom. This can be through the development of supportive relationships with students, as described previously, but also through showing students that faculty themselves

also prioritize their own mental wellbeing. For instance, setting boundaries around hours of communication up front for the course can reduce frustration around not receiving an immediate response to an off-hours email. When communicating these boundaries, we recommend that faculty explain why they are setting these limits (e.g., “It is important for me to prioritize my time with my family, so I am setting these boundaries up front”). By sharing with students how they are working to establish their own work-life balance, students can recognize that this is something they should work toward as well. This could lead to an opportunity for students to have time in class or on a homework assignment to establish their own boundaries that help them to prioritize time for self-care, sleep, and other healthy behaviors.

In addition to modeling wellness, faculty can share their own personal experiences, challenges, and perhaps even failures (where they feel comfortable) to help break down the expectation of perfectionism within engineering. Through showing students the challenges that they have faced in their journey through engineering, faculty can convey empathy and help to promote a growth mindset in students, which has been linked to positive outcomes related to academic achievement and mental health.^[37] Further interventions to increase growth mindset in engineers can be found in a recent scoping review by Campbell et al.^[38]

While modeling positive mental health in the classroom can help dismantle engineering norms, it is important that faculty also show prioritization of the mental health of their students. This can be done through showing empathy for students and the challenges that they face outside of the classroom, as well as incorporating inclusive classroom policies into their courses. There is significant literature on inclusive course design that works to remove barriers to success for all students.^[39] One way to integrate inclusive teaching practices that can support students who struggle with their mental health is through integration of flexible deadline policies. In doing this, faculty can provide students with a responsible way to extend deadlines to meet their needs as they navigate the semester. This allows students to exercise personal agency in making decisions around deadlines and has been shown to increase students’ perceived quality of work while decreasing stress.^[40] It has also been argued that flexible deadline policies are more representative of a work environment and help to reduce inequity associated with only offering extensions to those who ask.^[40] Further, while mental health concerns that are not associated with a diagnosis can impact course performance, they often do not meet the requirements necessary for obtaining accommodations from the university. As a result, students might not feel that they are able to ask for course flexibility because their mental health is not a “good enough” or a “real” excuse.^[18, 21] One strategy for integrating flexible deadlines into a course is through offering a specific number of extensions that will be offered without question or penalty. For instance, in a course

with ten homework assignments, an instructor could provide two “free” 48-hour extensions as long as they request the extension prior to the deadline. This helps to teach students the importance of clear communication and planning while also providing them with the personal agency to prioritize other aspects of their lives over an assignment deadline.

CLASSROOM WELLNESS ACTIVITIES

In addition to course policies, instructors can also communicate their support for student mental health and wellness by including syllabus statements and sharing campus resources. We encourage instructors to discuss the syllabus statement in the course introduction as well as throughout the semester. By highlighting and revisiting the statement, instructors demonstrate their support for student mental health and wellness, instead of students viewing the statement as a “boilerplate” statement added without thought or support from the instructor. In a recent study, one student described their experiences with college level implementation of syllabus statements: “I feel like only a few - estimating roughly 30% - would have a sort of human, character driven, response in saying those words. A lot of it is just policy and memorization...”^[21] This highlights the importance of ensuring that resources are shared with compassion and in alignment with other course policies. Further recommendations for syllabus statements and creating a syllabus that is supportive of mental health can be found in the literature.^[41, 42]

Studies have shown that the stress response can be contagious, where individuals can exhibit stress symptoms based solely upon interactions with those who are in distress.^[43] In fact, shared social identity (e.g., belonging to the same major/course/team, etc.) has been shown to increase the transfer of stress symptoms across individuals.^[44] Therefore, encouraging the use of activities that help to reduce distress, in particular around high stress deadlines or exams, can be especially important. Many universities offer wellness activities for students such as drop-in mindfulness sessions through a university counseling center. We see these resources as extremely valuable to students but also propose that there is value in bringing wellness activities into the classroom. Wellness activities in class may increase student accessibility (particularly for students who cite lack of time as a primary reason for not engaging with these resources)^[14] and demonstrate instructor care.^[45] Integrating these activities in class may counter engineering cultural narratives of “suffering and shared hardship”^[13] that lead to both the normalization and potential transfer of stress among students.^[46]

The time commitment for both preparation and implementation of classroom wellness activities can be small. Instructors do not need to be experts and can rely on existing resources such as mindfulness recordings offered by a variety of apps (e.g., Headspace, Calm). For example, short

stretch breaks, breathing exercises, or mindfulness could be added at the start, middle, or end of class for 1-5 minutes. Classroom wellness activities could also be connected to the course content. For example, Miller et al. developed a course design project where students learned about the physiology of stress and tested the impact of wellness activities using commercially available biometric devices.^[47] Students then proposed new designs of the biometric devices using design heuristics. A scoping literature review of interventions to support engineering student mental health has recently been published and provides insight into additional strategies that have been proven effective in the engineering classroom.^[48]

CONCLUSION

High stress and poor self-care have become normalized within engineering. As a result, faculty must take an active role in dismantling these norms and driving change towards an engineering education culture that is supportive of mental wellbeing. Integration of mental health and wellness in the classroom can take different forms, such as supporting the development of relationships, adopting inclusive teaching practices, and integrating wellness activities in the classroom. Through adoption of these practices, faculty showcase their support for student wellbeing, which can lead to positive impacts on student mental health, academic outcomes, and retention.

OPPORTUNITIES FOR DEVELOPMENT

While working to change the norms around mental health in engineering is important, faculty should also be prepared to support students who might be struggling with their mental health.^[22] Through taking advantage of campus, regional, and national training opportunities, faculty can learn the signs and symptoms of students who are in mental health distress. Training programs such as Mental Health First Aid and QPR (Question, Persuade, Refer) provide guidance for responding to students in distress and have been shown to improve mental health literacy on college campuses.^[49-51] Through these trainings, faculty can become better advocates and referral agents for students, helping to connect them to professional resources on campus. This preparation combined with proactive interventions can help support the overall success and wellbeing of students in engineering.

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