

Thinking Systemically to Better Serve Engineering Students' Mental Health Needs: Policy and Process Recommendations

Introduction

Both the demand for campus mental health services and the severity of mental health issues students are experiencing have increased over the past thirty years (Gibbons et al., 2019; Lipson et al., 2018; Rudd, 2004; Schwitzer, 2010; Watson, 2013). At the same time, many college students who need help either never seek help, or do not receive what they need when they do seek help (Eisenberg et al., 2007; Gibbons et al., 2019; Hyun et al., 2007; Mau & Fernandes, 2001). To improve mental health outcomes for students, there have been calls for further research on counselor-client dynamics and student experiences with college counseling services (Hom, 2002; Mau & Fernandes, 2001; Schwitzer, 2010) with the assumption that such research can contribute to improved services.

This paper responds to such calls by documenting the experiences of undergraduate students who have tried to use the mental health services on their campuses, focusing specifically on challenges they encountered. Through interviews with students who had experiences with mental health services, we identify several distinct types of challenges faced by students. The stories that characterize those challenges expand the existing research landscape by providing in-depth understandings of what students have encountered and what (mis)perceptions they hold about mental health services. By unpacking students' challenges, new opportunities for changes that could better serve their needs are revealed.

Literature Review

Gaps between need and help

Many students' mental health needs are not being met with current campus resources, and many either never seek help on campus or do not find what they need when they do (Eisenberg et al., 2007; Gibbons et al., 2019; Hyun et al., 2007; Mau & Fernandes, 2001). One nationwide study found that (depending on the condition) between 37% and 84% of students who screened positive for a mental health condition never sought help (Eisenberg et al., 2007). The gap between need and help may be more pronounced for some groups than others; use and satisfaction with campus counseling services varies across demographic groups (Banks, 2020; Eisenberg et al., 2007; Hyun et al., 2007; Mau & Fernandes, 2001). Additionally, use of services is known to vary by major, with engineering students being less likely to seek help than those in other majors (Hyun et al., 2006; Lipson et al. 2016). Such disparities matter because sustained use of counseling services for those who need them has been shown to improve not only mental health, but also measures of academic success, such as increased GPA and graduation (Schwitzer et al., 2018).

From students' perspectives, the reasons for the gap between need and help include a range of issues spanning lack of knowledge or awareness about services, skepticism about efficacy of services, long wait lists and delays to be seen, insurance and cost considerations, lack of time, and social stigmas around mental health (Banks, 2020; Eisenberg et al., 2007; Gibbons et al., 2019;

Hyun et al., 2007; López & Levy, 2013). From counseling centers' perspectives, the leading challenges in addressing the gap between need and help are budget and staffing shortages (Gibbons et al., 2019; Schwitzer, 2010; Watson, 2013). While demand has soared, funding for mental health services was stagnant over the past decade, and 88% of centers report staffing shortages, resulting in up to 48 days wait times on some campuses (Gibbons, 2019). In response to those challenges, many counseling centers have implemented practices such as wait-lists, session limits, referrals to outside offices, and community education and training (Watson, 2013).

Engineering Students

Prior studies have found that engineering students suffer from mental health issues at similar or higher rates than their non-engineering peers, a trend that has continued into the pandemic (Lee & Wan Adam, 2016; Lipson et al., 2016; Loosemore, Lim, & Ilievski, 2020). However, engineering students are less likely than their peers in other majors to seek help for mental health issues (Hyun et al., 2006; Lipson et al., 2016). Research also shows that engineering students from marginalized groups may face greater incidences of mental health disorders. For example, one U.S. survey found that women engineering students were more likely to screen positive for major depressive disorder (by a factor of 2.3), panic disorder (by a factor of 4.4), other anxiety disorders (by a factor of 2.2), and PTSD (by a factor of 1.9) than their men peers (Danowitz & Beddoes, 2022). The same study found that engineering students who identify as Hispanic or Latinx were more likely to screen positive for major depressive disorder (by a factor of 3.2) and PTSD (by a factor of 2.5) than respondents who identified as non-Hispanic/Latinx White; and that respondents reporting a physical disability were significantly more likely to screen positive for major psychological distress (by a factor of 2.2), other (non-major) depressive disorder (by a factor of 3.3), and PTSD (by a factor of 2.9). Further details on the prevalence of particular mental health challenges among engineering students can be found elsewhere (Danowitz & Beddoes, 2020, 2022a, 2022b; 2023; Jensen & Cross, 2021).

Methods

Interviewees were selected from among engineering students who had previously completed a survey about their mental health (Danowitz & Beddoes, 2020, 2022a, 2022b, 2023). When completing that survey, participants were asked to provide an email address if they wished to be contacted for follow-up research. In fall 2020, all survey participants who provided an email address were asked to complete a screening survey to help select interview participants. The screening survey asked potential interviewees if they had experienced challenges accessing university counseling services, if they had experienced challenges accessing university disability services, if they had experienced stigma around mental health issues as an engineering student, if they had experienced challenges requesting informal accommodations from instructors for mental health issues, and if they were a military veteran. If they answered *yes* to the questions about the counseling services, disability services, and informal accommodations, the survey asked if it was before the pandemic started, after, or both. The survey also asked respondents to provide their self-identified gender identity and racial or ethnic identity. Eighty students completed the screening survey, none of whom identified as veterans. We had resources to interview a set number of students and wanted to select interviewees who could share the greatest number of experiences. Therefore, participants who answered *yes* to at least three out of four non-demographic screening

questions were selected. That process yielded a pool of 32 possible interviewees, which was narrowed down to 14 by selecting interviewees from the greatest number of institutions and selecting interviewees who would increase the gender diversity of the sample.

The fourteen selected interviewees attended five universities in four different states in different regions of the United States. There were a range of institution types represented, including large public, small public, small private, research-focused, and primarily undergraduate. Interviewees were in (or had previously been in) departments of aerospace engineering, chemical engineering, computer engineering and computer science, and mechanical engineering. Two interviewees identified as gender non-binary, nine interviewees identified as women, and three identified as men. Two interviewees identified as Asian, four identified as Hispanic, Latino/a, or Latinx, and eight identified as White. Their self-reported clinical mental health diagnoses included ADHD, anxiety disorders, bipolar disorder, depression, OCD, and PTSD. Participants were in their second, third, fourth, and fifth years of college. Four interviewees were either taking a year or semester off of school or had switched out of engineering entirely at the time of the interview because of their mental health challenges, which we believe highlights the importance of better understanding this topic. It should be noted however that this group of interviewees is not a representative sample of the engineering student population.

Semi-structured interviews were conducted online in fall of 2020. They were audio recorded and transcribed. Interviewees were given \$40 Amazon.com gift cards for participating. The interview protocol began with the screening questions, with individual follow-up questions asked based on responses given. The structured prompts for all participants included: 1) Please tell me about the challenges you have experienced accessing or utilizing mental health related services through your university counseling center?; 2) Please tell me about the challenges you have experienced when trying to access or use mental health related accommodations through your university disability services center?; 3) Please tell me about the challenges you have experienced when trying to request informal accommodations from an instructor for mental health related issues?; 4) Can you tell me about the stigma you have experienced as an engineering student related to a mental health issue?; and 5) Is there anything else you think I should know about the topics we have discussed or about navigating mental health challenges as an engineering student?

Data was analyzed using an inductive open-coding approach in which data analysis began with open exploration designed to allow emergent themes (Charmaz, 2006). Interview transcripts were thematically coded using Dedoose software. The themes were emergent rather not prescribed by a pre-selected theoretical framework. This paper reports findings related to experiences with counseling and disability service centers. Findings related to the culture of engineering education are reported elsewhere (Beddoes & Danowitz, 2022). Quotations were edited for readability and text in square brackets was added by the authors for clarity. Gender-neutral pronouns are used for all interviewees to protect their anonymity.

Findings

This section describes leading types of challenges our interviewees reported. The findings reflect interviewees' beliefs and perceptions based on their experiences, and have not been fact-checked by the authors. The stories therefore may contain misperceptions or misunderstandings about

university policies and practices. However, we contend that even if the findings contain misperceptions or misunderstandings, these beliefs and perceptions are important to identify because they highlight areas that need better communication or messaging practices to correct students' misunderstandings. While we recognize that disability services and counseling services are separate entities with distinct purposes, our research revealed significant interrelatedness and similarity between the two types of centers vis-à-vis students' lived experiences. In this paper, we therefore discuss them holistically in order to reflect the grounded theory data rather than a priori professional or organizational distinctions.

1. Services tied to academic performance

Some students encountered challenges accessing services if their GPA was too high. They reported that there is a policy at their university that if a student's GPA is above a certain threshold, they cannot seek help from the disability services center. This policy prevented them from getting help they believed they needed. As one student explained:

At the university, I did really well academically, which didn't allow me to meet the requirements to seek help for certain conditions and like certain questions. Like, basically towards the end of my second quarter I was wondering if maybe I might have a problem in digesting information and then taking time because I found myself being very anxious and very kind of toxic almost while studying, so I did go to the [disability services center] to see if I could apply and see what type of help I could receive and for mental health issues. They do look into your GPA, and for my first quarter there that pushed me out of the eligibility requirements. I feel like that was a little unfair to assume that just because my one quarter here was good [I don't need help.] All of a sudden things happen, like changes happen, and just because of my good quarter I'm not allowed to seek help, which was a little annoying....The very fact that I have to lower my GPA to go [to the center] is kind of like 'what's the [point]'? Do you want us to do better or worse?

Decoupling academic performance from access to services would have benefitted this student, and likely others.

2. Fear of repercussions

Students expressed fears about several different types of repercussions they believed they could incur if they sought help. One type of fear was related to repercussions from family:

I feel scared to go to these places because I feel like if they said that I have some sort of mental disability, like panic anxiety disorder or anything like that, then it's going to affect a lot of people around me...So I feel like I've had challenges figuring out where these services are and if I could go to them safely...I do look at them on the website, but I just haven't had the courage to actually make an appointment, because it really scares me that if they do say that I have something or some kind of problem that my parents are going to be disappointed in me.

Another fear was the belief that if they used the disability services center, their diploma would say that they graduated with a disability, which would carry a stigma into their life and careers going forward. This is an example of something that is likely not true and may be a misperception, but it still impacted students' decision-making. A third fear was that having a record of mental health treatment or disability would limit their abilities to get jobs in the defense sector, which require security clearance. The same student above who feared repercussions from her family, also feared that "it's going to affect my chances of getting jobs." Another interviewee explained:

In the engineering field, specifically, the one that I'm in, aerospace engineering, a lot of our jobs, at least some of the really cool ones, you generally need a security clearance for them. And if you have like a disability, specifically mental disability, it can sometimes prevent you from getting a clearance or working in defense in certain jobs... A big thing that a lot of us experience is that when you want to work in defense or certain space jobs where you need a clearance and you're not perfectly mentally fit... so if you have any sort of mental illness, if it's anxiety, if it's depression, maybe those can get by, but anxiety is pretty questionable depending on how severe it is, if you have it stated that you have a disability for anxiety then that reduces or almost eliminates your chances of getting a clearance or getting into jobs.

It was primarily, but not exclusively, aerospace engineering students who discussed this fear; however, this phenomenon likely affects students in many engineering majors as the military (and associated contracting) is one of the largest employers of engineers in the United States (Riley, 2008). Further information about how this particular issue affects engineering students is discussed in (Beddoes & Danowitz, 2022).

3. Difficulties accessing services needed

This section covers five subsections that relate to having difficulties accessing services for various logistical, bureaucratic, and technological reasons.

Difficulty with bureaucracy and multiple offices

Participants told stories of "run arounds" and difficulties getting the services or information they needed in an efficient manner. These difficulties are so notorious at one university that the students even have a name for it:

I was sent on what we call the '[university name] run around', essentially. So I was sent from my honors program advisor, to the dean of students, to disability services, to the health center, to the counseling center, and then back to disability services, all on like one day. And that's different parts of campus. So I'm just running around, literally running around campus.

The same student also reported bureaucratic difficulties transferring information between offices:

Actually getting the referral from them was a lot of work because rather than them being willing to fax it to a doctor's office for me, they were like, 'No, you have to take it and deal

with it.' And then the doctor's offices said, 'Oh, it can only be faxed.' So I had to figure out how to fax something with no access to anything [instead of] the counseling center just faxing it over for me, knowing full-well that they have access to that technology.

Difficulty navigating websites, online forms, and initial screenings

Students also described difficulty with the process of center screenings and making initial appointments due to "complicated websites". It is important to note how students connected these challenges to the fact that they were already struggling with a mental health challenge that exacerbated the perceived level of difficulty. When dealing with depression, for example, they were more likely to just give up rather than persevere through the challenges encountered. One student explained that:

I tried to go, and I don't know anybody who successfully had an appointment...We've always talked about using [the counseling center] and it's just not intuitive or easy to use. It's more trouble than it's worth. A lot of times, if you actually are feeling depressed or something, you're not gonna want to put in a bunch of effort.

Similarly, as another student explained, the screening itself was so frustrating and time consuming that it "is a mental health issue":

They have the [intake forms] and before you go into an actual counseling appointment they want you to check through certain conditions, which makes sense obviously. But it was just an overload of information because it was just a PDF document with like 80 pages, and it was expected that you would read through it before actually applying. And it didn't make sense, like it wasn't a true check. And then another thing too, they had a mental health screening on the website which links to helpyourselfhelpothers.org. And when I did take the screening, I was expecting a reasonable and more clear answer—like, okay, should I further seek help or should I not further seek help? But the questions didn't allow more complexity in a sense of it was just like 'Do you have depression? Yes or No'...But the final consensus was just a table of all those questions and if I answered 'Yes', a link to another questionnaire, which was again an excess of information and not that clear on what I should be doing. There's so much stuff I have to be doing or I should be doing...It was just too much information. So it's like, 'Okay, because you answered this, you have to go click and go and do that survey and this survey'. And this is just too much. At that point, the survey itself is like a mental health issue.

Another interviewee connected their challenges with the website to anxiety. They recommended:

It would be a good idea to have more emphasis on the way we are designing our websites, especially the ones like the mental health resources...because whenever I do have this anxiety, I just go on to it and being in that anxious state of mind, seeing scattered information or like not a clear response is not helpful at all. It does more harm than good.

Lack of available of appointments

Many students expressed frustration over difficulties with getting appointments in a timely manner. One relayed a story about needing help coping with finals and end of term projects, but giving up when they could not get an appointment at the counseling center at all that quarter:

I asked my academic advisor, [and] he told me to call them to set an appointment. But when I called them they didn't answer, just like voicemail. So I left a voicemail and waited for a while, maybe it was two or three days, not exactly sure, but I remember them calling me back and saying that they were really full and weren't able to help me until after winter quarter. ...So yeah, I wasn't able to receive any type of mental health [help], especially with our finals and everything. I just stopped thinking about it and gave up because I didn't really know what to do. Everything was full. I just had to wait and then I felt like there was no point anymore.

Another described their counseling center as "so under staffed", and not able to offer appointments at times that worked for the student:

I stopped going because the only time that was available I think it was like three weeks or four weeks into the semester...and I could only [get an appointment] at 7am for the counseling and it was so early, on top of staying up super late for homework...I think they have five counselors and so it's just hard to get a time slot if you want one that can be suitable for your schedule. And I had also started working, so it was just like the time did not line up with my schedule when she was available.

Similar experiences with the counseling center and disability service center were recounted by two other students as well:

I went in there and I was like, 'I really need to see somebody like as soon as possible, like I really, really need to do this'. And they're like 'okay, go sit down at the computer and fill out the survey thing'. I'm like, 'Okay, sure, why not let me go do this outdated system while I'm already having a meltdown. That's fine'. So I went and filled out their survey about what was going on and whatever. And I pretty much told them I could come in literally anytime and I would figure it out with my classes, like it was fine. I needed to get it figured out. And it still took them almost over a week to get me in for an appointment, just my first appointment, and that was the first step I had to take in order to see a psychiatrist, because I had to get a referral from them to see one.

I was diagnosed with ADHD, so I had to do the application and then the whole meeting thing. But the issue that I faced with accommodation services was honestly the length of time. Trying to get that accommodation took so long and it honestly was very stressful. So I had to schedule like three and a half weeks out I think, and then when it came closer to it, they were double booked. So then I had to wait another week and then do that interview with the correct documentation and then wait another week to get my results back, if it was approved or not. And I remember having like two or three quizzes, [and] an exam coming up. So just the amount of stress because I wasn't sure if I would get [the accommodation] or not in time, honestly, I found that really challenging with the accommodations department.

One student reported their belief that the counseling center lies to students about what services they offer to try to send as many students as possible off campus because of their limited capacity. While the accuracy of this perception is not something we can comment on, the point is that this is something students believe that affects how they (and other students they talk to) are going to engage (and not engage) with the counseling center.

Not equipped to handle complex issues

There were also instances where, because of the specific mental health issues students faced, they were told they could not be helped on campus. This left them feeling forlorn and as if they were beyond help. For instance, one interviewee was told that the counseling center could not help her because she had too much “complex trauma”:

The part that was particularly awful was when I was going through a particularly traumatic time. I was having a lot of anxiety and so I was talking to...a therapist about this and they go, ‘Sure, let's go through what's causing your anxiety,’ and I told them what was going on in my life, and they said I had too much complex trauma for them to handle and that they could only refer me to someplace off campus. And I said, ‘I can't go off campus.’ That's something that I've heard [from] a couple of my friends that also have anxiety or depression or similar, [the counseling center] just only wants to deal with kids that are maybe like feeling overwhelmed from classes, like something they can handle on a small scale. But being told I had too much complex trauma for them to handle was not a fun thing to hear....That was really disconcerting to go through because some of what I was going through didn't feel like it was that bad, I guess it depends on who you ask, but I didn't think it was that bad. Apparently it was too bad for them.

A similar story was reported from another university as well:

I went and saw [a counselor], and she was a really sweet counselor, but she could not help at all. [There] ended up being a point where she's like, ‘Yeah, I just can't help you anymore. Sorry’. So I went and rescheduled with a different counselor and that took like another month, and then by the time I saw her she just said, ‘Yeah, you need to go off campus. I can't help you’. And it wasn't even because like medication or anything. They just felt like they couldn't help me, and it made me feel very hopeless, and I didn't feel like I had any resources and it's like, there's this whole health center here for a mental resource that I should be able to use, but why can't they help me? So I was really upset about that....I feel like there's so much talk about like, ‘Oh, these people can help you through all these life problems and what you're going through’. But I always felt worse after visiting them... For someone like me where I'm depressed, I struggle with hopelessness, so to come to a conclusion of like, ‘Hey, I can't help you’, just makes me feel way more hopeless... I just felt like I was just passed off because they couldn't find an easy fix for me, and it made me feel like also that the people were very untrained.

Likewise, others' experiences also led them to believe that the counseling center was only helpful if you need a “quick 30 minute session to vent about things”, not if you need more serious help

beyond that, or that the counselor “didn’t seem to understand that I was aware that my issue was an actual brain chemistry issue not ‘I just needed to learn some grounding techniques’. And it felt a lot like a waste of time being there”.

Using on-campus services requires going off-campus

In addition to those experiences being sent off campus as the final solution, students also reported that in order to access some services on campus, they were first required to go off-campus for certain diagnoses: interviewees described having to go off-campus for ADD testing and to see a psychiatrist before they would be able to use counseling and disability services on-campus. This was a problem for them because they did not have insurance or a car to get to the off-campus appointments.

4. Health insurance and financial barriers

Many interviewees reported that health insurance and financial challenges impacted their ability to use counseling services. Specifically, the challenges mentioned included only being offered a limited number of appointments each semester before they had to start paying out of pocket, and not being able to get all the help they needed without insurance. One student said they got six free appointments per semester, while another said they got three, and elaborated:

I think that the limit is three free ones. And then after that, I think it's \$50 a week. They sent an email and I saw it and I was kind of like, ‘man, that sucks’ because they sent out an email saying that with insurance, it would be \$50 for the counseling...[and] I would not be able to afford that.

Similarly, when discussing the counseling center, another interviewee explained:

I do know if you don't have health insurance there's no way to really get help. Because you have no documents to prove it, and stuff like that. So [that] might be something actually that would be helpful is if there was a way for students to get diagnosed ...without having health insurance.

This is perhaps one the largest and most difficult challenges to address and is one that cannot be solved by counseling centers and disability service centers on their own. Nonetheless, it is important to highlight so that the full spectrum of the gap between need and help is characterized.

Discussion

These findings reveal deeper insights in to students’ challenges with counseling and disability service centers than have been available from previous survey-based research. For instance, while “lack of time” has previously been identified as a barrier in surveys, this study revealed factors that explain what that lack of time actually means for students. For our interviewees, “lack of time” was related to difficulties having to access multiple different offices spread all over campus, having to go off campus for some services, and having to spend time trying to access antiquated technologies or understand long, confusing forms. As another example, “stigma” has previously

been identified as a barrier in surveys, but the interviews revealed some of the specific fears that lie behind the word “stigma” – namely parents’ judgement, and (mis)perception that their diploma will say they graduated with a disability. The findings also highlighted discipline-specific needs that have previously not been accounted for in survey research; namely that there are fears specific to engineering job requirements that prevent students from seeking help.

As Hom (2002) suggests, such findings can provide evidence from which to make recommendations for improving services and increasing the benefits students receive. While the findings point to many opportunities for policy change institution-wide, or even nation-wide, as well as challenges that could be addressed with a significant influx of resources, the findings also point to more modest changes that could be made by counseling and disability service center staff. For example, it seems there is a need to design and implement communication and media strategies that clearly inform students what information about a students’ use of mental health services gets shared, with whom, under what circumstances. Doing so could correct misperceptions and mitigate fear of stigmas that some students have around accessing services. Specifically having easy access to information on if and how parents can access their records, and stating that no information appears on diplomas, would be helpful according to our findings. Additionally, centers could conduct a critical review aimed at identifying procedures and policies that make things unnecessarily difficult for students to access help, ideally with input from outside experts and students themselves. For example, is it reasonable to require students to have access to a fax machine in 2022? Relatedly, a critical review of websites, forms, and screenings aimed at decreasing entry barriers and increasing ease of use for people already struggling with anxiety or depression would be helpful. There are likely already experts on many campuses, such as human-computer interaction or user experience scholars, who could help with such reviews.

Finally, there may be opportunities for proactively and creatively implementing new “first line of defense” resources that can address the less severe and more temporary mental health issues, such as stress or anxiety over exams, and thereby put less demand on licensed counselors so that they can save time and resources for more severe and chronic issues. This might be done for example by adding more mindfulness or overall wellness programming. Studies have shown that yoga and mindfulness can benefit both students’ mental health and academic performance (Beddoes & Danowitz, 2021). In the absence of significant increases in resources given to these centers, the above ideas may go some way toward improving help for students and the stories they share with their peers.

A combination of policy changes, different communication content and strategies, critical reviews with help from outside experts who are already at the university, and other changes would likely go some way toward addressing the leading challenges identified. Ultimately, perhaps findings such as these can also be used to advocate for more resources or larger policy changes in ways that are more compelling than survey data has proven to be on this front, as is often the case with qualitative data (Polletta, 2008; Sallee & Flood, 2012).

Conclusion

In prior work, aspects of engineering education programs that undermine students’ mental health have been identified, along with implications for engineering educators and administrators

(Beddoes & Danowitz, 2022). Policy and practice-related recommendations from that analysis included eliminating certain exam formats, sharing stories of “failure”, supporting faculty to be more understanding and accommodating, and not trivializing mental health challenges. In this paper, we turned to another aspect of the system: counseling and disability service centers. Based on interviews with undergraduate engineering students at five universities in the United States who had a variety of mental health diagnoses, we identified the challenges they encountered when trying to access counseling and disability service centers. The stories students shared bring to light previously undocumented challenges and deeper insights into the experiences that characterize barriers previously identified. They demonstrate that policy and process changes at the national, university, college of engineering, and student-service levels are all needed in order to better serve students’ mental health needs.

Acknowledgments

We are grateful to the students who generously shared their experiences with us to make this work possible. This material is based upon work supported by the National Science Foundation under grants EEC #1929484 and #1929478. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

References

- Beddoes, K. & Danowitz, A. (2022). In Their Own Words: How Aspects of Engineering Education Undermine Students’ Mental Health. American Society for Engineering Education Annual Conference, Minneapolis, MN.
- Banks, B. M. (2020). Meet them where they are: An outreach model to address university counseling center disparities. *Journal of College Student Psychotherapy*, 34(3), 240–251.
- Danowitz, A. & Beddoes, K. (2020). Work in Progress: A Snapshot of Mental Health and Wellness of Engineering Students Across the Western United States. Frontiers in Education Annual Conference, Virtual Conference.
- Danowitz, A. & Beddoes, K. (2022a). Mental Health in Engineering Education: Identifying Population and Intersectional Variation. *IEEE Transactions on Education*, 65(3), 257–266.
- Danowitz, A., & Beddoes, K. (2022b). How the COVID-19 Pandemic Reshaped Demographic Variation in Mental Health Among Diverse Engineering Student Populations. *Australasian Journal of Engineering Education*, 27(2), 67–76.
- Danowitz, A. & Beddoes, K. (2023). A Longitudinal Study of Mental Health During the COVID-19 Pandemic. American Society for Engineering Education Annual Conference, Baltimore, MD.
- Eisenberg, D., Golberstein, E., & Gollust, S. E. (2007). Help-Seeking and Access to Mental Health Care in a University Student Population. *Medical Care*, 45(7), 594–601.
- Gibbons, S., Trette-McLean, T., Crandall, A. A., Bingham, J. L., Garn, C. L., & Cox, J. C. (2019). Undergraduate students survey their peers on mental health: Perspectives and strategies for improving college counseling center outreach. *Journal of American College Health*, 67(6), 580–591.

- Hom, W. C. (2002). Applying Customer Satisfaction Theory to Community College Planning of Counseling Services. *I-Journal*, 2, 1–15.
- Hyun, J. K., Quinn, B. C., Madon, T., & Lustig, S. (2006). Graduate student mental health: Needs assessment and utilization of counseling services. *Journal of College Student Development*, 47(3), 247–266.
- Hyun, J., Quinn, B., Madon, T., & Lustig, S. (2007). Mental Health Need, Awareness, and Use of Counseling Services Among International Graduate Students. *Journal of American College Health*, 56(2), 109–118.
- Jensen, K.J., & Cross, K.J. (2021). Engineering stress culture: Relationships among mental health, engineering identity, and sense of inclusion. *Journal of Engineering Education*, 110(2), 371–392.
- Lee, M. F., and W. M. H. Wan Adam. (2016). A Comparison Study of Methods to Solve the Mental Health Problem between the Engineering and Non-Engineering Students. In 2016 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM), 179–83.
- Lipson, S. K., Lattie, E. G., & Eisenberg, D. (2018). Increased Rates of Mental Health Service Utilization by U.S. College Students: 10-Year Population-Level Trends (2007–2017). *Psychiatric Services*, 70(1), 60–63.
- Lipson, S. K., Zhou, S., Wagner III, B., Beck, K., & Eisenberg, D. (2016). Major Differences: Variations in Undergraduate and Graduate Student Mental Health and Treatment Utilization Across Academic Disciplines. *Journal of College Student Psychotherapy*, 30(1), 23–41.
- Loosemore, Martin, Benson Lim, and Marco Ilievski. (2020). Depression in Australian Undergraduate Construction Management, Civil Engineering, and Architecture Students: Prevalence, Symptoms, and Support. *Journal of Civil Engineering Education*, 146 (3), 1–14.
- López, R. L., & Levy, J. J. (2013). Student Athletes' Perceived Barriers to and Preferences for Seeking Counseling. *Journal of College Counseling*, 16(1), 19–31.
- Mau, W.-C., & Fernandes, A. (2001). Characteristics and satisfaction of students who used career counseling services. *Journal of College Student Development*, 42(6), 581–588.
- Polletta, F. (2008). Storytelling in Politics. *Contexts*, 7(4), 26–31.
- Riley, D. (2008). *Engineering and Social Justice*. Morgan & Claypool.
- Rudd, M. D. (2004). University Counseling Centers: Looking More and More Like Community Clinics. *Professional Psychology: Research and Practice*, 35(3), 316–317.
- Sallee, M. W., & Flood, J. T. (2012). Using Qualitative Research to Bridge Research, Policy, and Practice. *Theory Into Practice*, 51(2), 137–144.
- Schwitzer, A. M. (2010). College Counseling: Student Experiences and Client Dynamics. *Journal of College Counseling*, 13(1), 2–3.
- Schwitzer, A.M., et al. (2018). Students with mental health needs: College counseling experiences and academic success. *Journal of College Student Development*, 59(1), 3–20.
- Watson, J. C. (2013). Rethinking the Provision of Counseling Services: A Paradigm Shift for College Counselors. *Journal of College Counseling*, 16(1), 3–5.