Understanding How Finances Restrict Undergraduate Engineering Students
+ How YOU Can Help

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BACKGROUND

The soaring rates of mental health symptoms and distress among college students constitute a significant challenge for higher education, especially among undergraduate engineering students. In a recent national study, Lipson et al. (2022) found a significant increase in rates of depression (134.6%), anxiety (109.5%), and suicidal ideation (45.5%) among 350,000 racially diverse college students between 2013 and 2021. Students with marginalized or minoritized identities (e.g., students of color, first-generation college students, sexual and gender minorities) are even more likely to experience greater mental health concerns (e.g., Lipson et al., 2018; Lipson et al., 2022).

Preliminary data collected from students with marginalized identities at UNL for a larger grant about mental health in engineering suggests that financial challenges can exacerbate students' mental health challenges and impact the kinds of opportunities available to them. More investigation is needed to understand the relationship between financial hardship and minoritized engineering students' mental health, collegiate experiences, and career opportunities.

PURPOSE

- Documenting the lived realities of engineering students enduring financial hardships will provide a foundation to further investigate the consequences and accordingly learn how to combat them.
- By understanding how finances can constrain students, we can establish support systems and adapt teaching practices to make engineering more accessible, thus broadening participation across the discipline.

RESEARCH QUESTION

How do finances constrain undergraduate engineering students' experiences, mental health, and career opportunities?

STUDY CONTEXT

Broader Study: 21 Participants
- Full-time Engineering Undergraduates
- Historically Marginalized Identities
  - Students of Color
  - First-Generation College Students
  - Low-Socioeconomic Status
  - Sexual/Gender Minorities
- Large, public, university in the Midwest

The broader study aimed to holistically investigate factors that impact undergraduate engineering students' mental health.

This particular study strives to illuminate the stories specific to students enduring financial challenges.

The 11 participants in this study hold multiple other minoritized identities, offering valuable insights.

This Study: 11 Participants
- Subset of the 21 participants
- Low-Income (<$70k)
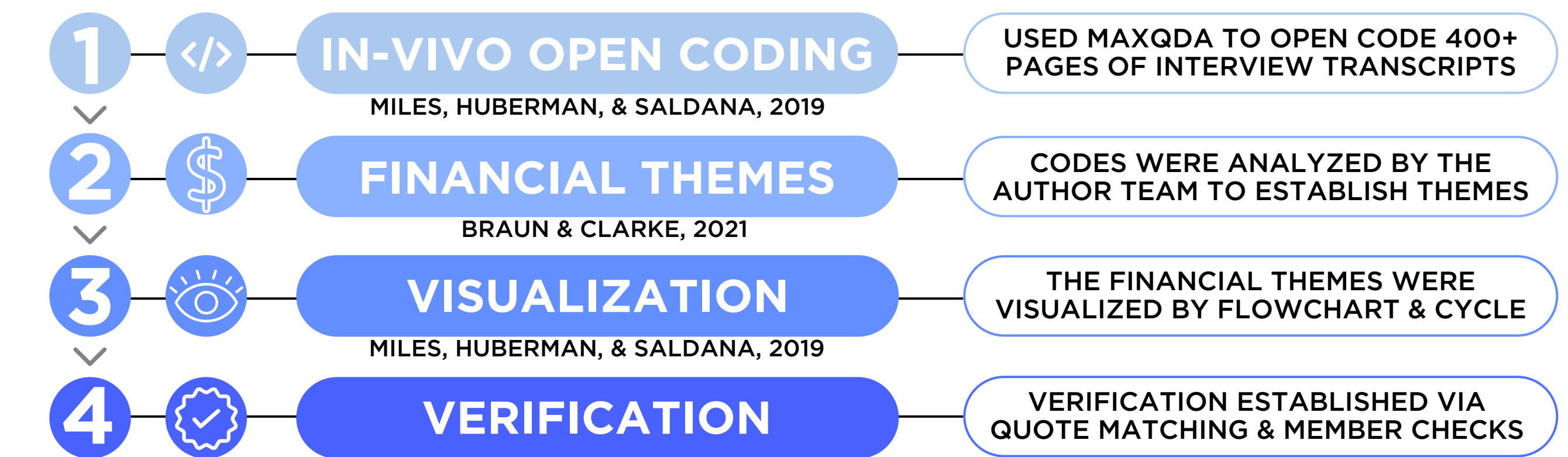- First-Generation College Students

ACKNOWLEDGEMENTS

METHODS

DATA COLLECTION

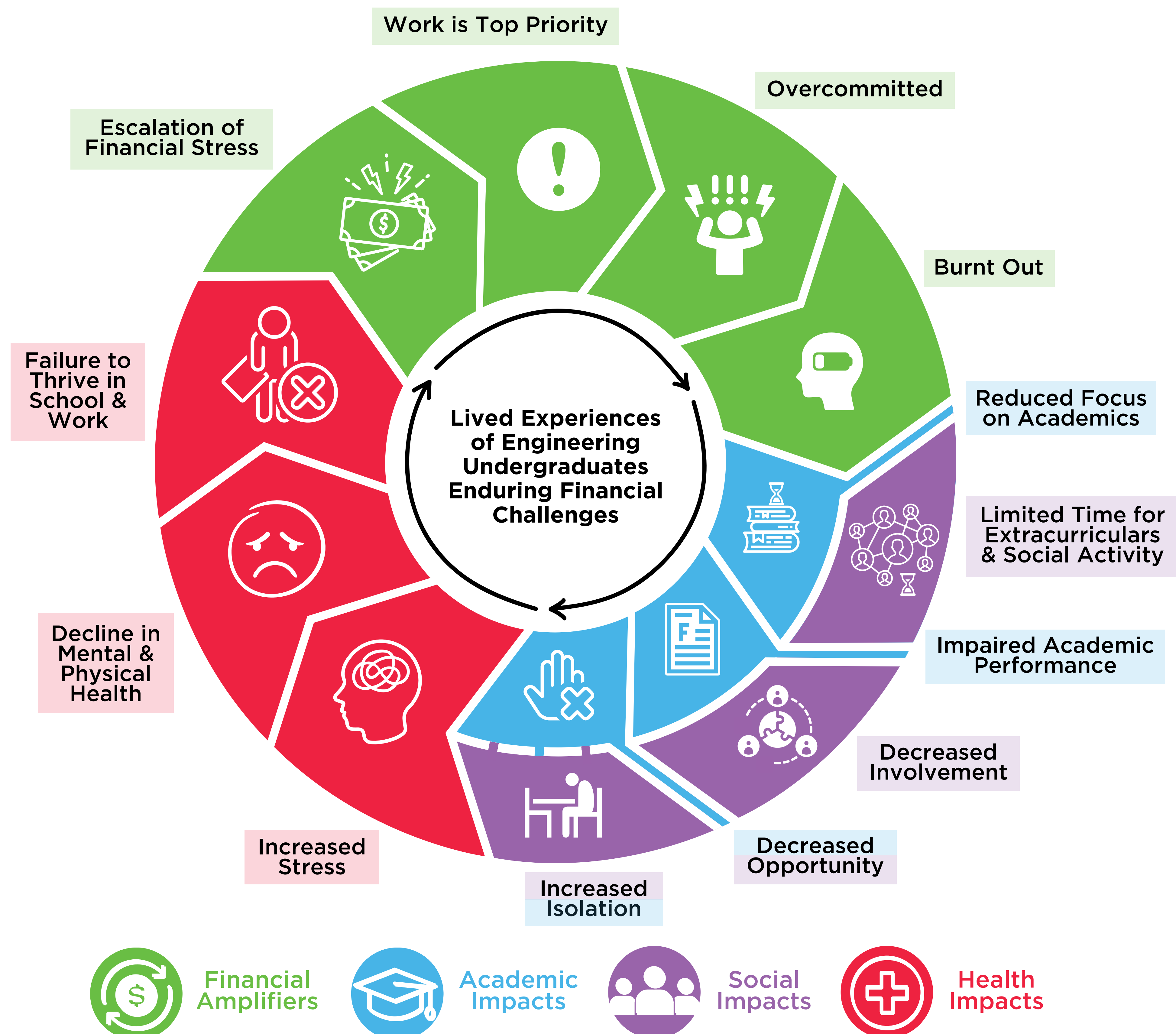|	
Study Design	• Qualitative Interview Study
Recruitment	• On-Campus Flyers & Department-Wide Emails
Screening	• Qualtrics Screening Survey
Consent	• IRB Approval & Informed Pre-Consent
Study Setting	• On-Campus or Zoom Semi-Structured Interviews
Method	• 60-minute Semi-Structured Interviews
Documentation	• Audio File Recordings & Transcription
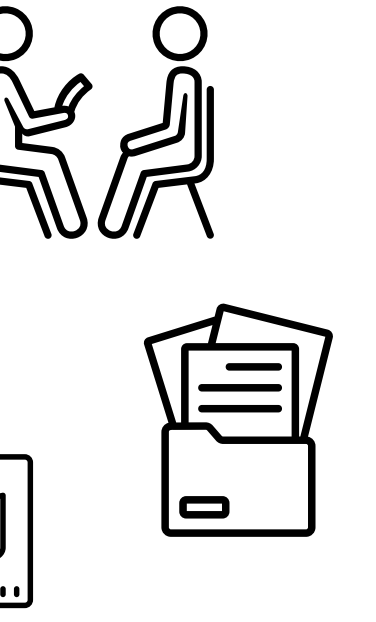
Example Interview Protocol Questions

I. What (if anything) have you found to be particularly challenging about being an engineering student? What have you found to be particularly easy or rewarding?

II. What about being an engineering student has negatively impacted your mental health? Positively?

III. Have you had any experiences in your engineering degree where you were or felt like you were the only person who had a similar background as you?

DATA ANALYSIS

1. **IN-VIVO OPEN CODING** — MILES, HUBERMAN, & SALDANA, 2019 — USED MAXQDA TO OPEN CODE 400+ PAGES OF INTERVIEW TRANSCRIPTS
2. **FINANCIAL THEMES** — BRAUN & CLARKE, 2021 — CODES WERE ANALYZED BY THE AUTHOR TEAM TO ESTABLISH THEMES
3. **VISUALIZATION** — MILES, HUBERMAN, & SALDANA, 2019 — THE FINANCIAL THEMES WERE VISUALIZED BY FLOWCHART & CYCLE
4. **VERIFICATION** — VERIFICATION ESTABLISHED VIA QUOTE MATCHING & MEMBER CHECKS

FINDINGS

Lived Experiences of Engineering Undergraduates Enduring Financial Challenges

Cycle labels: Work is Top Priority · Overcommitted · Burnt Out · Reduced Focus on Academics · Limited Time for Extracurriculars & Social Activity · Impaired Academic Performance · Decreased Involvement · Decreased Opportunity · Increased Isolation · Increased Stress · Decline in Mental & Physical Health · Failure to Thrive in School & Work · Escalation of Financial Stress

Legend: Financial Amplifiers · Academic Impacts · Social Impacts · Health Impacts

Work is Top Priority
"Yeah, I have some scholarships, but it's my responsibility to get my student bills paid. Engineering credit hours are more expensive, we have more lab fees." — P17

Overcommitted | Burnt Out
"I spend every waking moment ignoring homework because I wanted some time to unwind, and I couldn't unwind because I had to go to work." — P1

Reduced Focus on Academics
"I have had jobs on campus since I was a sophomore, and so part of my time is spent working as opposed to working on [school] projects and then not having to stay up as late at night." — P17

Impaired Academic Performance
"It's hard because the classes are difficult, so it's a lot on your plate. I work three part-time jobs, so I have no free time. I don't get a lot of sleep, so I just have to do my best to prioritize." — P20

Decreased Opportunity
"Several of my classmate's parents are giving them an allowance or paying for their school, so they can really focus on school and getting jobs or doing research, like good things to put on their resume." — P9

Limited Time for Extracurriculars & Social Activity
"I wasn't able to go to most of my classes or clubs. I was in a really dark place, it was a really stressful time and it was mostly because I felt like I had to keep it all to myself and I couldn't share it with anyone else." — P12

Decreased Involvement
"It is important to get involved on campus, but I am an engineering student and I'm working almost 20 hours a week, so I just don't have time to get involved like some of my peers that don't have to work." — P9

Increased Isolation
"I just kept to myself everything that was happening with me and I distanced myself from everything, I would say even my friends …" — P12

Increased Stress
"… and that really caused me to be in emotional distress."
"Sometimes we are really not okay, and there's not really much we can do about it." — P12/9

Decline in Overall Health
"You want to do more, which makes you sacrifice your self-care time and time with friends; and I like both of those things. When you sacrifice those, your mental health goes down." — P9

Failure to Thrive
"My mental health was completely wiped out and I was really exhausted. I was really depressed, too. This was primarily because of my financial situation." — P12

Escalation of Financial Stress
"I have a scholarship that depends on my grades; I could enjoy engineering way more if I didn't have to keep such a high GPA. It's tricky." — P13

ACTION STEPS

1. **SEEK TO UNDERSTAND AND EMPATHIZE** — We must aim to learn about the realities of their challenges to better empathize with them and their circumstances. This understanding will motivate taking action.

2. **OFFER VIRTUAL OFFICE HOURS** — Due to their restrictive schedules, students need easy access to help. By offering virtual office hours, they can join when they otherwise couldn't make it to campus.

3. **ENCOURAGE STUDENTS TO ASK FOR HELP** — Enduring financial hardship alone often results in hyper-independent individuals. Creating an environment where asking for help is encouraged is necessary.

4. **PROVIDE OPPORTUNITIES TO CHECK IN** — Intentionally checking in reminds students that their experiences matter. Inquiring about their circumstances/challenges will stimulate valuable dialogue.

5. **PROVIDE SUPPLEMENTARY RESOURCES** — Providing supplementary learning materials, such as videos or extra practice problems can reduce the stress felt by students who have limited time for school.

6. **NORMALIZE 4.5+ YEAR DEGREE TRACKS** — Completing an engineering degree in the traditional 4 years is a rigorous process. By normalizing 4.5+ year degree plans, students can do what is best for them.

7. **SET ASIDE TIME FOR TEAM PROJECT WORK** — Team projects are integral for engineering; however, coordinating group meetings can be difficult. Setting aside time in class can help alleviate this challenge.

8. **STRIVE FOR CONNECTION** — All individuals benefit from authentic connection. Striving to connect with students in class will be a catalyst for changing engineering for the better.