Confronting a Double Pandemic of COVID-19 and Racial Injustice: Identifying Opportunities for Redesign and Reinvention

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ABSTRACT

This is the high-level story of the Mechanical Engineering (ME) department at Stanford University in three parts: The abrupt change at the end of our Winter Quarter (March 2020), the transition to a fully online Spring Quarter (April-June 2020), and the overdue confrontation of racial injustice (June 2020-present). Told from the perspective of one faculty member, it highlights that the need for Teaching Communities has never been more acute, as educators are challenged to create online courses that are engaging and inclusive—and represent compassionate education.

Key words: Racial Injustice, COVID-19, Virtual Engineering Education

INTRODUCTION

This is the high-level story of the Mechanical Engineering (ME) department at Stanford University starting in March of 2020. It follows the transition from a largely in-person Winter Quarter to an entirely online Spring Quarter due to COVID-19 and describes resources that were created to support the 61 instructors and 59 courses involved. However, the story takes a swift turn as another pandemic—that of racial injustice—confronts instructors and students in the final weeks of Spring Quarter. Both pandemics demand new thinking around effective education.

METHOD: STORYTELLING

I share my perspective as a Stanford faculty member (so it is but one of many "COVID-19 teacher/educator stories"), informed by my current[1] and past roles[2]. The focus of this story is not on technologies best suited for online education, but rather the importance of us (the department,

university, and higher education altogether) being a Teaching Community that works together and promotes respectful relationships between all members to support personal and intellectual growth and flourishing.

RESULTS

Chapter 1—Community Formation (we are going to do what?!?!)

The second-to-last week of Winter Quarter (Week 9, March 9–15) looked the same as usual. I was teaching 35 undergraduates in "Introduction to Mechanical Engineering" and students were preparing for the following week's in-person final showcase. These plans were not realized as classes moved online in response to COVID-19 public health guidance; final exams were rescheduled or optional and the end-of-quarter course survey was modified (Appendix A).

To prepare for Spring Quarter, Stanford's Faculty Senate voted (March 26) to change the grading basis for all University courses to Satisfactory/No Credit (S/NC) and to delay the quarter's start by one week, giving instructors two full weeks to shift to online teaching. Within ME, a team formed to support the 61 instructors teaching the 59 offered ME courses that needed to redesign laboratory work, hardware building, and team interaction. This group, the ME-TLC (Technology-assisted Learning Community)[3], had a self-defined mission of (i) assisting individual instructors and Course Assistants on technological and pedagogical needs, (ii) sharing instructional practices and flagging new resources, and (iii) building a supportive and interactive Teaching Community. For me, the ME-TLC is an extension of my years devoted to building engineering education research and practice communities.

Chapter 2—April–June 2020: A New Steady-State Spring Quarter

The ME-TLC launched three major projects in Spring Quarter. First was a semi-regular newsletter[4], covering topics like online office hours recommendations, virtual well-being resources, and Classroom Assessment Techniques. Second was a pair of mid-quarter surveys examining student and instructor experiences, successful online strategies, and people's emotional states (Figures 1–3). Finally, the ME-TLC hosted a ME Teaching Summit (June 5), attended by 60+ individuals to celebrate and share Spring Quarter achievements while looking ahead to next year (Appendix B).

By late May, we had learned to survive (if not thrive) in this new Zoom-facilitated world; I felt like we were entering the "home stretch." Classes were wrapping up[5] and our department even designed a virtual "ME Celebration of Graduates" as traditional graduation ceremonies were postponed. Despite uncertainties of the upcoming academic year (i.e., *Will students be allowed on campus? How would in-person classes function given a small stock of classrooms that could facilitate social-distancing?),*
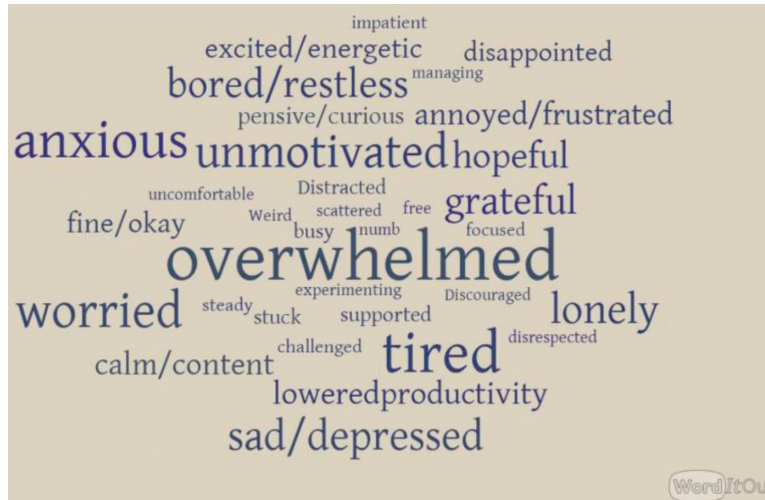
Figure 1. Three-Word Word Cloud. From the ME Student Listening4Action Survey[6] (April 29-May 3, 2020; Week 4) question, "Please share 3 words or short phrases that describe how you are feeling right now."

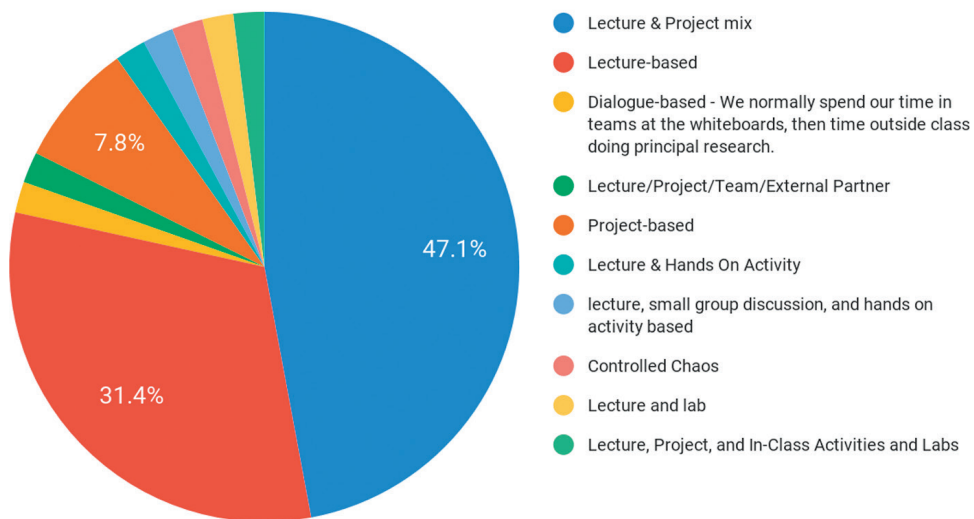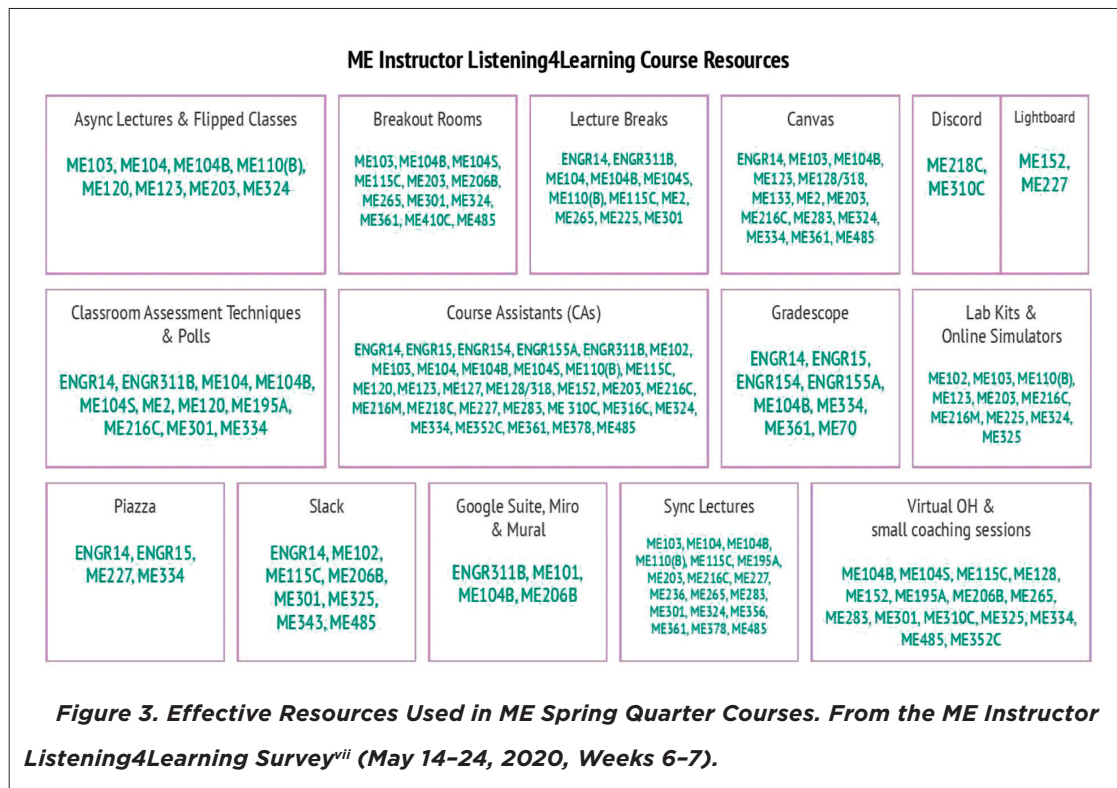*Figure 2. Spring Quarter Modes of Teaching. From the ME Instructor Listening4Learning Survey[7] (May 14–24, 2020, Weeks 6–7).*

ME Instructor Listening4Learning Course Resources

Async Lectures & Flipped Classes

ME103, ME104, ME104B, ME110(B), ME120, ME123, ME203, ME324

Breakout Rooms

ME103, ME104B, ME104S, ME115C, ME203, ME206B, ME265, ME301, ME324, ME361, ME410C, ME485

Lecture Breaks

ENGR14, ENGR311B, ME104, ME104B, ME104S, ME110(B), ME115C, ME2, ME265, ME225, ME301

Canvas

ENGR14, ME103, ME104B, ME123, ME128/318, ME133, ME2, ME203, ME216C, ME283, ME324, ME334, ME361, ME485

Discord

ME218C, ME310C

Lightboard

ME152, ME227

Classroom Assessment Techniques & Polls

ENGR14, ENGR311B, ME104, ME104B, ME104S, ME2, ME120, ME195A, ME216C, ME301, ME334

Course Assistants (CAs)

ENGR14, ENGR15, ENGR154, ENGR155A, ENGR311B, ME102, ME103, ME104, ME104B, ME104S, ME110(B), ME115C, ME120, ME123, ME127, ME128/318, ME152, ME203, ME216C, ME216M, ME218C, ME227, ME283, ME 310C, ME316C, ME324, ME334, ME352C, ME361, ME378, ME485

Gradescope

ENGR14, ENGR15, ENGR154, ENGR155A, ME104B, ME334, ME361, ME70

Lab Kits & Online Simulators

ME102, ME103, ME110(B), ME123, ME203, ME216C, ME216M, ME225, ME324, ME325

Piazza

ENGR14, ENGR15, ME227, ME334

Slack

ENGR14, ME102, ME115C, ME206B, ME301, ME325, ME343, ME485

Google Suite, Miro & Mural

ENGR311B, ME101, ME104B, ME206B

Sync Lectures

ME103, ME104, ME104B, ME110(B), ME115C, ME195A, ME203, ME216C, ME227, ME236, ME265, ME283, ME301, ME324, ME356, ME361, ME378, ME485

Virtual OH & small coaching sessions

ME104B, ME104S, ME115C, ME128, ME152, ME195A, ME206B, ME265, ME283, ME301, ME310C, ME325, ME334, ME485, ME352C

Figure 3. Effective Resources Used in ME Spring Quarter Courses. From the ME Instructor Listening4Learning Survey[vii] (May 14–24, 2020, Weeks 6–7).

we knew what worked in the virtual classroom (and what didn't) and felt better prepared to spend the summer, alongside community, redesigning our courses.

Chapter 3—June 2020-Present: A Rude (and long overdue) Awakening

That feeling of being on the "home stretch" ended abruptly for me, a White woman, with the murder of George Floyd on May 25, 2020. Many colleagues were similarly affected as our Black students voiced their pain, fear, and anger—feelings heightened by the recent violent deaths of numerous Black people but which stemmed from the longstanding, continued existence and displays of racism. Their intensely personal stories provided startling glimpses into their lives—leaving their jacket hoods down (even in broad daylight) for fear of being stopped *on campus*, hearing gunshots daily in their current neighborhoods, receiving email silence from faculty and consequently, questioning their worth.

We had been oblivious to their reality: Our Black students do not feel like they belong—or are welcomed—in ME.

"Black students are living in cities that are undergoing an unprecedented amount of turmoil. We are afraid, we are exhausted, and we are rightfully angry. Words alone cannot help us right now. We need tangible support and action."

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*"It is exhausting to continuously feel that we are simply not valued at this institution,
<u>especially</u> at a time like this, and <u>especially</u> by a large authority figure. To 'hear our voices'
would mean to listen and respond to these voices...."*

In the final weeks of Spring Quarter, some ME students struggled to be students (during an already stressful time) amid personal circumstances and a desire to participate in the national protests against racial injustice. Students asked for academic accommodations[8]: "*I wanted to ask your advice on the best route for seeing that these accommodations can be mandated at an administrative level? ...it would be tremendously valuable to Black engineering students to see this support when we often feel that we do not belong at this institution.*"

In my opinion, we, as instructors, a department, a School of Engineering, and a University, fumbled awkwardly in our response to accommodation requests. Perhaps a "bottom-up," decentralized organization such as Stanford is impractical when needing to collect information, make decisions, and communicate in a short period of time. I believe administrators at all levels were struggling: *Should there be a University-wide statement regarding the events and a policy on their implications for completing the quarter? How much autonomy should individual faculty have in interpreting such a policy for their courses? What does "fairness" look like in this situation? Who has the authority to decide any of this?*

Ultimately, instructors established their own (varying) policies: Some ME instructors evaluated students based on work submitted up-through Week 9 and canceled remaining assignments, whereas others asked students to complete coursework to the best of their ability to receive a passing grade of "Satisfactory."

NEXT STEPS

The end of the year opened our eyes to the good, the bad, and the ugly. We may have adapted to online teaching and organized a departmental Town Hall[9] to address racial injustice, but we have failed to identify our own biases and passivity, and we certainly have failed to create and be an all-inclusive Community. We need to engage in deeper learning, unlearning, and reflection in order to practice compassion and better understand how discrimination is built into structural elements of the department (i.e., advising, graduate admissions).

We have a lot of work to do. Our first steps—attending a Centering Marginalized Voices workshop with Dereca Blackmon[10] and forming the ME Diversity & Inclusion Committee[11]—are only the beginning. ME-TLC's publications now revisit course fundamentals like "know my students". Instructors

will need to examine both the explicit and implicit cues in their courses that strengthen or suppress a culture of belonging for our students, a growing challenge with next year's planned "hybrid" environment. As we pledged on June 1: "Stanford Mechanical Engineering does not tolerate any hateful language, images, or other acts of intolerance, as we are building a safe and inclusive community in person and online[12]." It is our responsibility as a Teaching Community to make this the lived experience for all of our students, faculty, and staff[13].

GRATEFULNESS

While this is my story of COVID-19 and Racial Injustice, it is informed and affected by many. I want to acknowledge my students who have been my teachers for so many years (and I expect this will continue to be). I am also grateful for and inspired by my collaborations with Tammy Liaw, Helen Chen, Sonia Travaglini, Brittany Coffer, and Kristin Burns through the ME-TLC group and beyond, and for Dr. Ellen Kuhl's (ME Chair) heartfelt engagement in improving ME education for all. My ideas are also inspired, challenged, and deepened by members of the Designing Education Lab and colleagues and friends: Prof. Michele Elam, Anika Green, Dereca Blackmon, Dr. Joseph Towles, Prof. Tom Kenny, Dr. Carol Muller, Dr. Shannon Gilmartin and Portia Carryer. Our partnerships in struggling to be better people and foster a compassionate world are precious and invaluable to me.

AUTHOR

Sheri D. Sheppard is a Stanford professor of Mechanical Engineering. Besides teaching design-and mechanics related courses, she conducts research on how people become engineers. From 1999-2008 she was the Senior Scholar at the Carnegie Foundation for the Advancement of Teaching principally responsible for the Preparations for the Professions Program (PPP) engineering study, the results of which are contained in the report Educating Engineers: Designing for the Future of the Field. In addition, she served as Chair of Stanford's Faculty Senate in 2006–2007, and as Associate Vice Provost of Graduate Education from 2008-2013. In 2014 she was named U.S. Professor of the Year-Doctorial and Research Universities (CASE and the Carnegie Foundation for the Advancement of Teaching). Before coming to Stanford University, she held several positions in the automotive industry, including senior research engineer at Ford Motor Company's Scientific Research Lab. Dr. Sheppard's graduate work was done at the University of Michigan.

APPENDIX A: CHANGES TO THE END OF WINTER QUARTER

COVID-19 update: online classes, *announcement from the Provost (March 6, 2020):* https://news.stanford.edu/2020/03/06/letter-provost-drell-covid-19-updates-online-classes-admit-weekend/

Revised winter exam schedule, *announcement from the Vice Provost for Faculty Development, Teaching and Learning (March 18, 2020):* https://healthalerts.stanford.edu/covid-19/2020/03/18/revised-winter-exam-schedule-announced/

Important information regarding COVID-19, end-term course feedback form: https://evals.stanford.edu/end-term-feedback
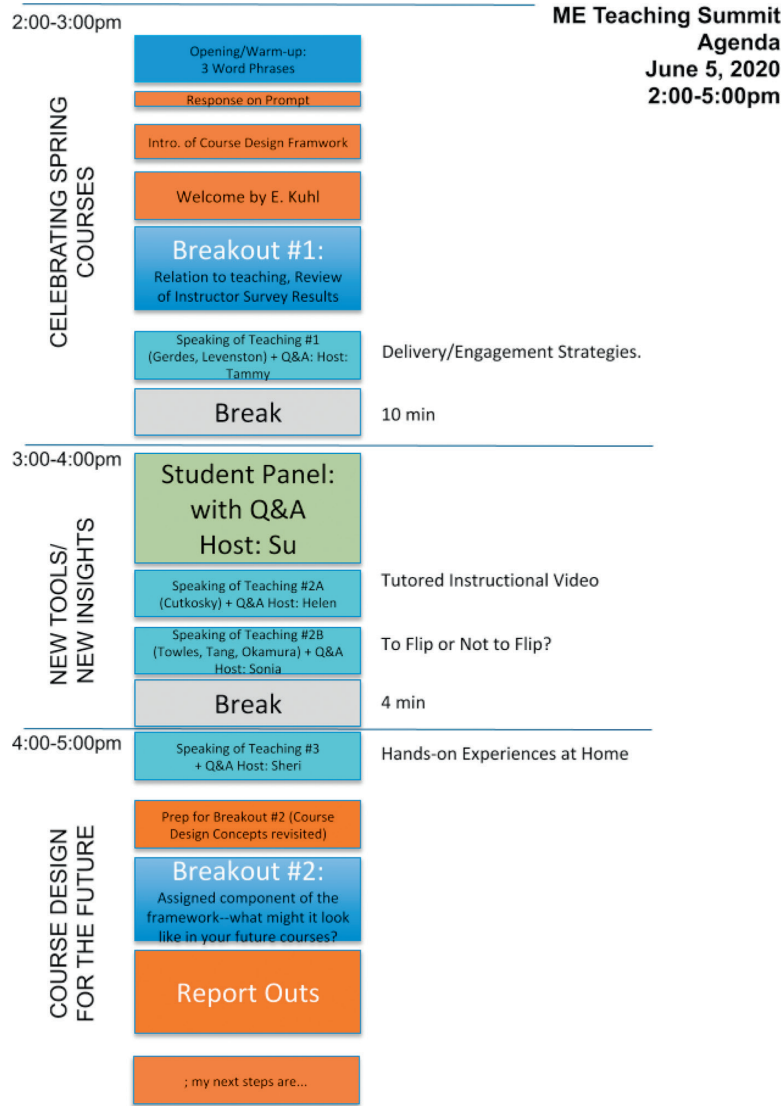
Due to the disruptions to teaching and learning at the end of the 2019-2020 Winter term, the COVID-19 Academic Continuity Group – with approval from all school deans – decided to remove numerical results related to three core questions common to most student course evaluation forms. The results from these questions have been eliminated from the course evaluation system and will not appear in Course Reports or any other data downloads for the 2019-2020 Winter term.

- *How much did you learn from this course?*
- *Overall, how would you describe the quality of the instruction in this course?*
- *How organized was the course?*

APPENDIX B: ME TEACHING SUMMIT AGENDA

ME Teaching Summit
Agenda
June 5, 2020
2:00-5:00pm

2:00-3:00pm

CELEBRATING SPRING COURSES

Opening/Warm-up: 3 Word Phrases

Response on Prompt

Intro. of Course Design Framwork

Welcome by E. Kuhl

Breakout #1: Relation to teaching, Review of Instructor Survey Results

Speaking of Teaching #1 (Gerdes, Levenston) + Q&A: Host: Tammy — Delivery/Engagement Strategies.

Break — 10 min

3:00-4:00pm

NEW TOOLS/ NEW INSIGHTS

Student Panel: with Q&A Host: Su

Speaking of Teaching #2A (Cutkosky) + Q&A Host: Helen — Tutored Instructional Video

Speaking of Teaching #2B (Towles, Tang, Okamura) + Q&A Host: Sonia — To Flip or Not to Flip?

Break — 4 min

4:00-5:00pm

Speaking of Teaching #3 + Q&A Host: Sheri — Hands-on Experiences at Home

COURSE DESIGN FOR THE FUTURE

Prep for Breakout #2 (Course Design Concepts revisited)

Breakout #2: Assigned component of the framework--what might it look like in your future courses?

Report Outs

; my next steps are...

ENDNOTES

1   classroom teacher, engineering education researcher, co-chair of the ME Undergraduate Curriculum Committee, Faculty Senate & Steering Committee Member

2   chair of the Faculty Senate, associate Vice Provost for Graduate Education

3   Sheri Sheppard (ME Professor), Tammy Liaw (ME Program Administrator), Helen L. Chen (PhD, Research Scientist), Sonia Travaglini (PhD, ME Science Engineering Education Fellow), Brittany Coffer (ME Design Group Front Desk Administrator)

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4 Full ME-TLC newsletter archive: https://us19.campaign-archive.com/home/?u=0b770406687c9be5573d13b77&id=55a8df1dec

5 Faculty Senate decision on March 26 removed the traditional final exam period for timed exams for Spring Quarter. See the Registrar's Office for more information: https://registrar.stanford.edu/students/final-exams/previous-years-exams/spring-quarter-exams-2019-20

6 Listening4Action survey findings disseminated via newsletters to instructors (https://us19.campaign-archive.com/?u=0b770406687c9be5573d13b77&id=1d234140d7) and students (https://us19.campaign-archive.com/?u=0b770406687c9be5573d13b77&id=d02e52b332); the depth of feelings expressed by the 140 student respondents prompted the department to host faculty and CA workshops led by Dr. John Austin, Special Assistant for Mental Health & Well Being, on "ME Online Education: Remote Learning and Mental Well-Being" to better support their students

7 Listening4Learning survey findings presented at the ME Teaching Summit; survey questions addressed instructors' perceived effectiveness of various online tools (from the instructor's point-of-view) and their overall strategy to adapting to online teaching

8 Academic accommodations are legally-mandated modifications, adjustments, auxiliary aids, and/or services that give a student with a disability an equal opportunity to benefit from the educational process. It is useful to think of accommodations as adjustments to how things are normally done. See Stanford's Office of Accessible Education for more information: https://oae.stanford.edu/accommodations/academic-accommodations

9 To maintain a safe space for our students, staff, and instructors, there is no recording or transcript of the Town Hall. View the slide deck: https://drive.google.com/file/d/1jIqHn0jlerEpSqc9y31MIM1iwkYpZOVz/view

10 CEO of the Inclusion Design Group. Ms. Blackmon served as the Associate Dean and Director of the Diversity and First-Gen Office at Stanford and has over 20 years of experience in working with a variety of corporate, educational, nonprofit, and community-based groups to address issues of race, gender, class, and social justice

11 ME Diversity & Inclusion website: https://me.stanford.edu/about/diversity-inclusion

12 Full ME Message of Support: https://me.stanford.edu/message-support

13 These ideas are further described in a Future of Everything PODCAST interview of S. Sheppard on "How do we design a new kind of engineer?" July 28, 2020. Host: R. Altman: https://stanford.us5.list-manage.com/track/click?u=a8e6569da943904e9ac369cde&id=3d5804a8e3&e=3f625f0b24