Building a Culture of Integrity in Engineering

Co-author 1 and Peter Newbury, August 2021

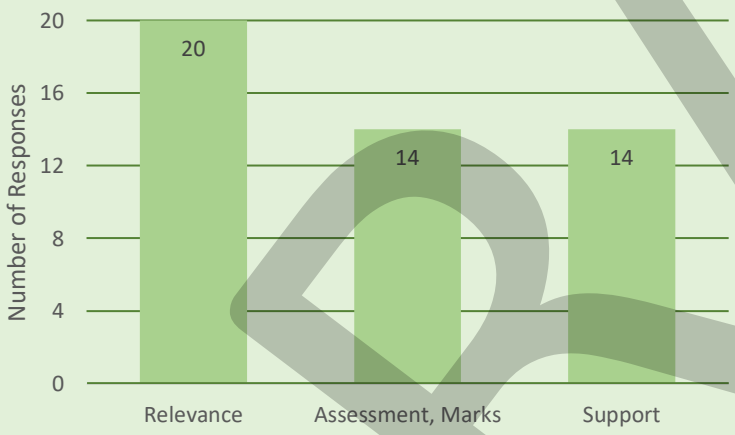
Structures crack when they're under too much stress. Redesign the structure to remove the excess stress and you stop it from cracking. The rise in academic integrity violations during the year of online teaching and learning is a crack in our teaching and learning practices.

Research into academic integrity[1] shows that the way to reduce academic dishonesty is to create a learning environment where students are successful without resorting to dishonest practices and even if they stray, there is no benefit. Creating and maintaining this environment requires ongoing discussion, collaboration, and cooperation of faculty, students, and staff. Together, we can build a culture of integrity that enables more students to be more successful, reduces exam stress and anxiety on both students and faculty, and puts our students on the path to becoming professional engineers.

In June, 2021, Co-author 1 and Peter Newbury surveyed and interviewed 19 Engineering students about their experiences with academic integrity. Co-author 2, Co-author 3, and Peter Newbury coded and categorized their 109 responses to three questions. The most frequent responses are shown here, together with strategies you can use in your courses. The full report and analysis of the students' responses is available upon request.

1. Lang, J. M. (2013). *Cheating lessons*. Harvard University Press.

What would make the homework, lab reports, quizzes, exams, etc. **meaningful to you**, so that you'd want to use your time and attention to do it yourself?



Relevance

Make the work relevant to: (i) the material in the course, (ii) the material in other courses, (iii) industry, and (iv) career aspirations.

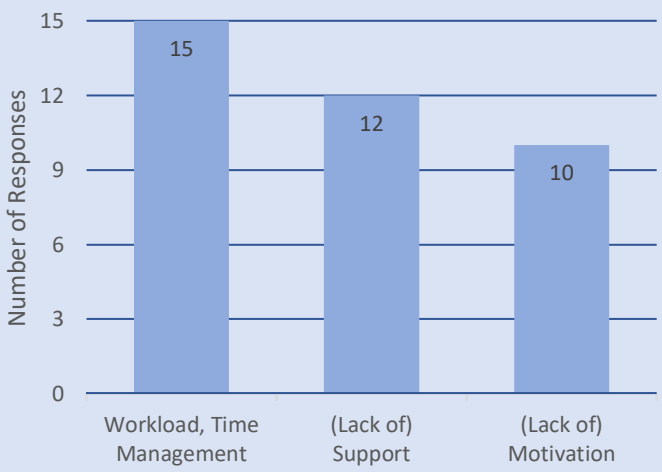
Sample Student Responses

- I'm more inclined to do work when I'm also taught how it applies to industry or how it applies to other skills I will apply in the future as an engineer.
- I think they typically mean a lot to me anyway, but to make it more meaningful, I feel like I would be more motivated to do them if it were related to solving real world problems that have had a big impact in the communities I'm a part of (for example, working on engineering projects that deal with the Sustainable Development Goals and so on).

What are the ways I can make my course relevant to my students?

You don't need to link every concept and every example to a relevant application every single time. In fact, artificially forcing relevance into your lessons can demotivate students.

- Periodically (perhaps once each week) motivate a new concept or example with an application or scenario from engineering practice or a specific field of research.
- Wrap new concepts and skills in contexts that matter to students in this time, in this place, or in their personal lives so they immediately see the role and impact of engineering on their lives, family, friends, and community.
- Connect learning outcomes, concepts, skills, and examples to the Graduate Attributes. Emphasize to your students that demonstrating the learning outcomes means they are becoming engineers.
- Chat with the course instructors who teach courses after yours in the program so you can motivate new topics: "This will be important next Term when you study…"
- Chat with the course instructors teaching the other courses your students are currently taking. Identify examples, applications, scenarios, or cases that combine concepts and skills from several courses.



Workload, Time Management

Workload demands in a given course and throughout the program leading to stress on students to perform well and meet all course expectations. Student and professor time management issues.

Sample Student Responses

- Something to note: it takes time to organize your time. Knowing assignment weights for prioritization, knowing deadlines, being able to find assignments easily, being able to find notes easily to solve problems, and even knowing what is expected on exams and how they will be formatted.
- I think for all engineering students, the workload is very heavy which can make it difficult to complete all work individually. It is still possible to do it individually, but I believe that the workload does play a role in making it difficult for students to complete work individually.

What are the ways I can help my students handle the workload and manage their time?

Learning how to manage their time is a skill students are still developing. They may need guidance, especially in 1st year when experiences inside and outside the classroom are new to many.

- Don't overload your students: design your course so students can be successful with 6 – 9 hours of work per week (including lectures), 9 – 12 hours per week for courses with labs.
- During the year of learning online, students appreciated it when course instructors suggested how to spend their time ("On Mondays, spend 2 hours watching videos and taking notes. On Tuesdays, begin the homework. On Wednesdays,…") Continue to provide this guidance, even for in-person classes.
- Work with your Department and your students' other course instructors to coordinate the timing of your assignments, projects, quizzes, and midterm exams. Try to ensure students have no more than one assignment due, project deadline, quiz, or midterm on any day across all their courses.

Effective Communication, Ethics, Professionalism

Engage in well-thought-out communications with individuals and groups. Appeal to the integrity of all involved in the engineering education process; draw on the P.Eng. Code of Ethics.

Sample Student Responses

- Communicate through student leaders – students listen to them. Through Dal Eng Society.
- I think just talking to them would be good. Hopefully by just talking to them, or having a presentation, discussion can happen between students and this culture of integrity can develop.
- phrase it as something that will strengthen their career and not just create obstacles in school.

What are the ways I can communicate effectively and connect with my students?

The year of online learning demonstrated Brightspace can be an effective tools for communicating with students. Continue to use Brightspace to make important announcements (including the ones you made aloud during your in-person classes.)

- Students appreciate fewer, more comprehensive Brightspace announcements. Consider one (two at most) weekly announcement that includes all the information students need for the upcoming week.
- Invite people with first-hand experience (students for student events, practicing engineers for community events) to announce extra-curricular events and opportunities.
- Treat your students as professionals: they are on a path to becoming engineers and that path begins in 1st year.