On the first day of the first oceanography class I took – back in 1996 – Professor Jim Carlton framed science as 5 Ps: phenomenon, pattern, process, prediction, and policy. Research begins with observing some phenomenon, he said, which if patiently described is likely to reveal a spatial or temporal pattern, driven by some underlying process. As scientists, we apply our understanding of the relevant processes to make predictions, and ultimately many of our findings inform individual and community decision-making, and broader policy. Importantly, that last P was introduced within the framework of science, not as something that happens separately, afterward. As science educators, I believe a crucial role we play right now is helping students to make the connections between understanding the world around them and putting that understanding into actions, both for the sake of humans’ ability to live sustainably on Earth and for students’ own self-efficacy.

A recent study of attitudes held by U.S. adults about climate change by Marlon et al. (2019) which appears as part of a series on Public Will, Activism and Climate Change in Frontiers in Communication, connects beliefs (both hope and doubt) to civic action in a way that is timely for sustainability educators -- and perhaps all educators today. Nearly a quarter of the participants in the study report being not hopeful when asked, “What, if anything, makes you hopeful that global warming can be reduced?” Among the hopeful, those who hold constructive hope (e.g., my/our actions can make a difference) are much more likely to say they engage in
civic action related to climate change than those who hold false hope or wishful thinking (e.g., it will all just work out somehow).

Marlon et al. (2019) also identify two types of doubt, which can be predictors of civic action. Those who hold constructive doubt (e.g., individual greed is a barrier to action) are more likely to report engaging in civic action, because such barriers can be addressed. Whereas, those who hold a more fatalistic type of doubt (e.g., there is nothing I/we can do) are less likely to do so.

Williams-Mystic students work together to raise anchor using the capstan aboard the US Brig NIAGARA. (Photo credit: L. Gilbert)

Hope and doubt can work together as part of a growth mindset that stirs action. That is, action is motivated by “hope that solutions exist and can be implemented, as well as doubt that the problem will resolve itself without action” (Marlon et al., 2019). In contrast, either pessimism or optimism can reflect a more fixed mindset leading to inaction. This message is an important reminder that my job as an educator is to meet students wherever they are and help them build
self-efficacy that their actions can influence outcomes. Acknowledging, for example, that some students may arrive in my classes next semester feeling unmotivated because of various types of doubt and hope (or lack thereof), I must build help them build self-efficacy for action in small and big ways, and then, as Greta Thunberg suggests*, hope will follow.

Another key message in Marlon et al. 2019 is related to the social dimensions of problem solving. Feeling part of a system larger than ourselves and believing that our actions contribute to the functioning of that system are two ideas that are inextricably linked. I’ve been taking groups of undergraduates to sea with Williams-Mystic for nearly two decades, and I see the same changes happen each semester: students quickly identify that their actions (from keeping a sharp lookout for other ships to carefully processing samples to really making sure the dishes are clean) are essential to the safety, success, and health to the larger system of the ship. I teach systems thinking as a framework for contemplating the interconnectedness of our actions, and also as a framework for studying the ocean and sustainable ocean-related practices.

The current moment has me worried that students across all educational levels around the world may be experiencing a decline in self-efficacy. I am especially concerned about the role that isolation is playing for students losing confidence that their actions can make a difference. For some students, the feeling of being connected to something larger than themselves and carried along by it may happen only at school. And so many students of all ages are facing increasing poverty, trauma, reduced or no access to education, and myriad other challenges related (and unrelated) to the current global pandemic. Even those who are privileged to be able to access education from home may face a lack of support, time, and space for studying. Let’s acknowledge that what we are facing right now can make it hard to find motivation, to believe that our actions make a difference, to find much to care about beyond what’s right in front of us.

Residential undergraduate life in the U.S. and elsewhere normally seeks to create a sort of bubble that can reduce (but not ameliorate) a few of the factors that limit student success. For
many who live away from home while enrolled in a college or university, it can be impossible to completely disconnect from hardships at home with the prevalence of cell phones. Still, students in residential undergraduate programs can at least find hours, and sometimes days, when they get wrapped up in the very hopeful act of studying and taking positive actions for their own futures. The large number of college students studying from home by necessity in 2020 worries me in so many ways, but of course so does the increased health risks of them on college campuses.

We are in the midst of a wicked problem – well, really several at once – with no easy answers. I have little professional expertise to offer direct solutions to any of them. What I do have is experience, through teaching about sustainability, of helping students confront seemingly impossible problems in constructive ways that keep them, and all of us, moving forward. As educators we can acknowledge the state of the world, validate students’ feelings, and then find ways to bring constructive hope and constructive doubt into their lives.

This semester, I will tell my students that I too sometimes feel overwhelmed, but teaching is a way to express my hope, and learning is a way to show theirs. I will facilitate relationships in my classes, taught entirely online, and guide students to supporting one another so that they feel part of a system even as they may feel physically isolated from their peers. And I will keep policy in science. I believe it is an essential part of my job to empower students to make well-informed decisions, and the first step towards that action is helping them improve their self-efficacy.

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