

Education like you give a damn: A student & instructor manifesto for working on Grand Challenges

“Grand Challenges” are the tough, seemingly unsolvable problems facing humanity (think of climate change, global poverty, clean air, clean water, gender empowerment, racial inequality). The top-ten list below outlines a philosophy for students and educators to work on addressing Grand Challenges.

(1) Education matters

The purpose of knowledge is to solve problems and improve the human condition.

Uncovering new knowledge and learning from existing knowledge are vital. If you want to address injustice, have positive impact, save the environment, improve health, or otherwise help the planet, deep subject knowledge will help you be effective. Knowledge gained via formal and informal education are both important.

(2) The real world and the people in it can teach us a lot

Effective solutions require engaging outside the comfort of a classroom, laboratory, or office. Get outside—into the street, lake, forest, landfill, community, or wherever the problem you care about is happening. Talk to experts, mentors, and people involved with the issue; ask the right questions; listen deeply; make observations; form your own opinion.

(3) See the world through others’ eyes

Who are the stakeholders, and why should they care about your solution? *Your opinion is less important than stakeholders’ opinions.* Your solution will not work unless the people involved in the problem see sufficient value; those people might be customers, beneficiaries, investors, journalists, private citizens, regulators, employees of existing organizations working on this problem, or anyone else whose actions and opinions will influence your success. How do they see this problem? Cultural differences are sometimes obvious, sometimes less so, but they are critical to understanding problems and solutions.

(4) Multidisciplinary teams are the first step to solving big problems

Grand Challenges exceed the capacity of any one person or academic discipline; solutions reflecting just one discipline or viewpoint are less likely to succeed. Being effective demands *multidisciplinary teams working on interdisciplinary solutions.* Work with people from different backgrounds and who see the world differently than you do. In your team, talk about motivations, concerns, roles and responsibilities; over time, they may change.

(5) Instructors and students are in this together

During engaged instruction, such as one might find in a teaching hospital, *students are asked to investigate, evaluate, and perform like a junior colleague*; learning takes place where the problems occur; and, students investigate problems that might lack a clear answer. To give students the necessary autonomy and agency, students should define the

problems they wish to tackle, identify the solutions they wish to work on, and be held to high standards. Solutions they propose must be holistic, realistic, and reflective of the true complexity of the Grand Challenge considered. Grand Challenge classes aim to provide tools to do that effectively.

(6) Sustained Impact

To have real impact, *strive to identify solutions that last, and that can scale to the size of the problem*, i.e., would work beyond a single location or for only a brief time. Doing so requires consideration for financial self-sustainability, for making adaptations necessary for local context, and for the multiple paths one can take to have impact. Solutions must have social and financial value, that is, have positive impact on the Grand Challenge and also deliver sufficient economic value to be financially sustainable. A critical component of the social value proposition is a Theory of Change: a step-by-step description of how the team's actions will impact the Grand Challenge and how the world will be different with their solution versus without it.

(7) Go, do!

Don't wait for someone's permission to fix a problem, just go solve it. Think big, start small, move fast. Learn by doing, but make sure you aren't causing harm along the way.

(8) Failure is healthy

If you aren't failing, you aren't taking risks or operating outside your comfort zone. *Failure is learning.* Innovation is rarely failure-free; strive to fail faster (again, making sure not to cause harm). Be self-skeptical, test your assumptions, drop approaches that don't work to make space for approaches that do. Whatever your ideas are, someone has probably tried something similar, elsewhere; learn about research and best practices in your area.

(9) Technology is only part of the puzzle

Technology is important, but it is merely a means to an end; technical solutions lacking social, political, and economic consideration rarely last. One must understand the problem and its socio-political context to find effective solutions. History is littered with marvelous solutions that solved the wrong problem. *Think deeply about the problem you aim to solve, the underlying reasons that problem persists (and linking these understandings to your Theory of Change), why you wish to work on it, and what impact you hope to have.*

(10) Have fun! Do what is meaningful to you.

Work on problems you care about deeply. Grand Challenge problems are hard to solve. (If they were easy, they would have been solved already.) If you work on topics you aren't passionate about, when things get tough you'll leave. Why bother? Instead, take time to find something you care about (it might take awhile) and that is worthy of your effort, then attack with fervor. Stay curious; get feedback. Never stop learning.