

Introduction

When students write their essays for college applications, the most popular question they need to answer is why they want to study that specific major, and overall, the most generic response received is that students want to “help people”. Students particularly apply to STEM majors with the idea that they want to make an impact and give back to the community. This idea focuses specifically on the “E” in STEM – “engineering” since our team is comprised of two engineers, but it can ultimately be applied to the other fields as well.

According to the National Society of Professional Engineers’ Code of Ethics, the number one fundamental canon that all engineers must abide by is to “hold paramount the safety, health, and welfare of the public”. If this is truly the case, then engineering students must be taught to uphold such values in more than just a lecture format. They should be given opportunities to use their knowledge to prioritize the safety, health, and welfare of the less fortunate within society. If educational institutions teach students such codes of ethics and values in the classroom, they should also lead examples and practice what they preach. This is where the idea of humanitarian engineering comes in.

Humanitarian engineering is the application of engineering-based solutions to provide underprivileged populations enhanced access to their basic human needs such as shelter, clean water, and clean energy. The undergraduate STEM education model for 2040 and beyond should include emphasis on the importance of selfless service and humanitarianism. STEM education must go beyond purely technical knowledge and should shape students to be well-rounded worldly citizens, not just through optional extracurricular activities, but directly through the curriculum. Addition of a humanitarian engineering course would meet the needs of students by providing them a holistic view of their industry, science by providing circumstances for the advancement of technology, and society by improving the quality of life of those less fortunate.

Idea Explanation

The proposed idea is the addition of a course to the curricula of engineering universities that focuses specifically on humanitarian engineering. Provided in a pass/fail format, this course would be a graduation requirement for undergraduate students in all engineering majors. The first few weeks of the semester would include traditional lectures and discussion about relevant topics in humanitarian engineering such as crisis management, food security, disaster response, and sustainable living. Students will learn about the definition and history of humanitarian engineering, examples of projects, and about organizations such as Engineers Without Borders (EWB). The remainder of the course would be dedicated to students volunteering to work on a project within humanitarian engineering. Their opportunities to contribute to such projects could be open ended, local or global, physical or virtual. By the end of the experience, the students must provide a reflection on their role in the project and the impact they had. The point of this project is to show the endless ways that engineers can help regardless of the level of experience they have, and that each person does have a skill to bring to the table.

Following this idea and the fact that the future of education is moving towards more forms of distant learning, students can volunteer virtually to contribute to any humanitarian engineering projects. Students can use any of their skills from technical knowledge to help design software, to project management and strategy skills, or even marketing and awareness campaigning. Engineering Without Borders provides opportunities on their website for students to apply for a project and provides a specific filter called “virtual volunteering” for those who want to use their skills to help in other ways. Such a project will engage student thinking as they become aware of global issues and crises and will fully believe that they can become part of the change. As engineers specifically, the solutions the students may come up with can really have an impact on society. Youth can provide a completely different perspective than industrial professionals and have the potential to advance current technologies in groundbreaking and creative ways.

Idea Implementation

In order to establish this idea by 2040, there would need to be an agreement within engineering universities to add such a course as a requirement. Giving back to our country and world in general should be particularly important in public universities.

As of now, humanitarian engineering is not offered as a field of study in most universities within the US. There are programs abroad that provide certificates or minors in this field, but it is not established as a major of its own, even at the graduate level. The first step in the implementation of this idea would be to secure instructors that are well educated in humanitarian engineering; the qualifications for these professors may be adjusted to find people with experience rather than a certain degree. Another option would be to advertise for such positions within educators and allow them enough time to take the necessary trainings. Eventually, by 2040, the hope would be that humanitarian engineering would become an established degree. The first step should be one course at a time.

This idea inherently proposes a change in students' mindset towards engineering as more than a field that solely has respect for being technically challenging. In terms of faculty, there would need to be more professors ready to teach this course, and at this point universities will need to identify ways of providing the teachers with appropriate training. In terms of societal development, our regularly changing world would really benefit from more humanitarian aid as has become crystal clear during this current pandemic. Selfless service should be more than just an option; in this day in age, it is a duty.

Discussion

- The symposium can contribute to this idea by leading discussions to propose even more potential topics in which humanitarian engineering students can contribute to.
- Just like distance learning, virtual volunteering will be essential in the future. Now is the time to establish and set up methods to make it possible.