Engineering World Health
2020 Remote Summer Institute
Final Report

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Executive Summary

Due to the COVID-19 pandemic, Engineering World Health was unable to run our traditional Summer Institute programs. In response, EWH launched the Remote Summer Institute, a 6-week online design program that brought together groups of students from the United States, Norway, Denmark, and Nepal. This program was a general success. The Remote SI hosted 28 total participants from 8 different universities. 4 participants were from universities in Scandinavia, 8 were from universities in the United States, and 16 were from universities in Nepal. Participants were divided into 6 teams.

During the 6-week program, the participants worked in teams of 4-5. Teams included a mix of American, Scandinavian, and Nepali students. The technical training comprised lectures, live sessions, and meetings with team mentors. Each team developed a design which addressed a health need in a low-resource setting.

The participants **collectively produced 6 complete design projects**. Concepts ranged from a flood-proof first aid kit to a solar autoclave. Several designs addressed current needs driven by the COVID-19 pandemic, as well as needs within Nepal. A design winner was selected from the group based on problem identification, design concept, implementation strategy, and project demonstration.

Our participant feedback was very positive: 97% of participants agreed or strongly agreed that they worked productively with people of different cultural backgrounds. Nearly 80% appreciated working in groups with diverse perspectives.

In summary, the Remote Summer Institute was highly productive and an overall success. We are grateful to all who helped make this program possible.

Design Projects

EWH asked participants to identify a global health need and design a solution appropriate to low-resource areas. Through lectures, teamwork, and research, the participants identified needs and developed designs to address those needs. The groups completed a total of 6 projects. Here we will summarize each design. To see more about each project, watch the presentations here.

Team 1 - Waterproof First Aid Kit

A waterproof first aid kit for emergencies in Nepal. Team 1 carefully considered local contexts for their design, ensuring it would float, be waterproof, durable, and contain all the products first aid teams would be likely to need in response to natural disasters.

Team 2 - Mobile Support for Paramedics

A mobile support for paramedics to bring patients to the correct hospitals. Delays in emergency transportation can lead to loss of life, so Team 2 addressed this need in Nepal and designed an improved system for guiding paramedics to the most appropriate hospital for the patients' needs.

Team 3 - Low-Cost Multipurpose Infant Incubator

A multipurpose infant incubator with a heat therapy application. Team 3's project addressed neonatal mortality in low-resource areas. Their design focused on lower cost, durability, and portability, as existing incubators and warmers are not well-suited to low-resource hospitals.

Team 4 - Solar Autoclave

A solar autoclave with UV sanitation. Team 4 designed an autoclave for use in rural areas with limited electricity. Their project thoughtfully discusses the design process, including UV sanitization and solar power to reduce hospitals' dependence on electricity for cleaning tools.

Team 5 - UV Light Sterilization System

Team 5 addressed a need related to Covd-19 in low-resource settings. Their UV Light Sterilization design aimed to help decontaminate PPE for reuse. They also designed a mobile app to accompany their UV Sterilization system to control the time and intensity of the UV light.

Team 6 - Prone Support System for Covid-19 Patients

A portable prone support system for Covid-19 patients suffering from Acute Respiratory Distress Syndrome. Team 6 did an excellent job discussing their design process. They clearly explained the need for their design and how their design

improved upon existing prone support systems, including space for ventilator tubing and increased portability.

Participant Debriefs and Feedback

Our participant feedback was extremely positive this year. Some of the words used to describe the program were innovative, educational, and encouraging. Most participants found the most challenging part of the program to be the virtual aspect, either due to technical difficulties or a preference for meeting in person. The Facilitators received positive feedback, with participants noting that the "immense support" they received helped them grow as engineers.

Below are some comments taken directly from the participant feedback about the Remote Summer Institute:

"I joined this course with expectations and hope of learning new things in the field of biomedical engineering and today I am grateful to share with you that my expectation has been exceeded after being a part of this course. Getting the chance to coordinate with you and the international colleagues, learning innovative ideas from them, sharing experiences and knowledge has certainly aided in my growth as a biomedical engineering student."

"The experience taught me the importance of cross-cultural communication, especially when developing biomedical solutions for low income communities."

"I truly learned a lot about low-resource design and barriers of access to medical technology around the world. It was a very special experience working with and getting to know my teammates."

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