survey at the end of the course revealed that this research project enabled them to understand system design aspects along with how innovative use of telecommunication technology infrastructure was able to contribute to the improvement of quality of life and provide improved access for humanitarian action. The survey also indicated that they became more aware of the use of technology for public good

In order to give students an experience of technologies that serve the needs of communities in developing countries and to improve the quality of life, a multi-disciplinary course titled: "Appropriate Technology for Developing Communities" was created at Rose Hulman Institute and presented by M.M. Payne et al[2] at the 123rd Annual Conference of ASEE in 2016. Findings from a survey of students in this course indicated that "they were able to get a real-world glimpse into the opportunities and challenges of practicing engineering in developing communities" and that "they expressed interest and joy in learning the content and its focus on humanitarian engineering context".

Another study by Bielefeldt and Canney[3] presented the differences between disciplines and institutions on humanitarian aspiration for engineering students. A survey was conducted by the authors to study if the students felt that an ability to help others was a central message in their major. Findings from their survey indicate that while 73% of students in Civil Engineering major are in agreement, only 45% of Electrical and Computer engineering majors say the same. The study also indicated that Christian institutions were among the highest to respond positively to this survey question. Clearly these studies indicate that whenever possible it would be expedient to incorporate technology applications for improving quality of life of the underprivileged into the courses and more so in Electrical and Computer engineering majors as fewer students in this major feel the ability to help those in need as central message in their major.

Effective response in humanitarian crises has been made possible through innovative uses of Information and Communication Technologies (ICT). Through the use of software application in mobile devices several novel resources have been created for benefitting the impoverished and disadvantaged as described in the blog on 'Mobile Money: Getting banking services to the poor[4]. Ellis et al[5] described that in software engineering courses, humanitarian education was infused by engaging students in a project on creation of open source disaster management software. The humanitarian aspect to this project was listed as one of benefits to the students.

It has been suggested by Kevin M. Passino[1] that in order to encourage volunteerism it is essential to give assignments that explore and promote it even if they were entirely "paper studies". The reference further supports research based assignments – "students could be asked to research and then provide a survey of current volunteerism projects that clearly require engineering skills".

The Jesuit University Humanitarian Action Network (JUHAN)[6] at Fairfield University together with Universidad Central Americana (UCA) and Georgetown University agreed to jointly explore the following three-part question ("The Big Question") - What is human suffering and why does it exist in the world today?, what are individual and collective responsibilities for humanity?, and; what can we do about it? A group of faculty members from different disciplines were selected to form a Faculty Learning Community (FLC) to examine these questions as well as understandings relating to humanitarian action and infuse them into the curriculum. The FLC met several times over a semester. As a participant of the FLC, the author's work with students

humanitarian action, it

Results and Discussion:

Student comments in the survey at the end of the course:

> Project was interesting and learned new ways to help people in need technically
>
> Good work to learn technology with humanity
>
> Helped to learn more about humanitarian actions
>
> More aware about human suffering and need to eradicate them
>
> Helped me to think and contribute something to the world
>
> Learned different kinds of communication systems used during hazards
>
> Got to know about humanitarian projects
>
> It showed the impact technology can have on the world
>
> It was interesting change from normal engineering homework
>
> An opportunity to learn apart from books
>
> One more step towards a better world
>
> It was interesting, you should incorporate "Engineers without Borders" as well
>
> Helped me understand how technology can be used in rural places

The survey among the 17 students participating in the course suggests that all of them believe that technology is meant to help and alleviate human suffering, with 15 of them feeling that they have a stronger sense of responsibility for using technology to advance humanity after the project work in the course. The remaining two were unsure. Four more were unsure if they would have felt that way, if they had not participated in the course.

All but one of the seventeen students in the course believe that they will be able to respond individually and collectively with solutions for global public good based on the learnings in the course. Fifteen of the participants feel that homework assignments and the videos as well as weblinks in the blackboard (BB) contributed to their learning and have assisted them in carrying out the research project.

Further, all but one in the class responded that they are now more likely to volunteer their technology skills and knowledge for work in the field of humanitarian action and that the course and the project have been helpful in this regard. Fourteen out of the seventeen responded that their being a part of the project contributed to their learning; the remaining three who felt otherwise however in their narrative comments confirmed the usefulness and interesting dimensions of the project.

Overall, it is clear that students have gained insights to the contributions that telecommunication technology can make for advancing response in humanitarian crisis.

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