Commentary: Educating global engineers through footbridges

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Thombile Tsela’s children are celebrating that, for the first time in their lives, they will not need to worry about crossing the Mbuluzi River. Likewise, Thombile can relax, knowing she can now sell her bread year-round and have more stability in her income. For about 75% of the 1.4 million people in the kingdom of Eswatini, walking is the primary mode of mobility. When the rainy seasons come, rivers flood and people must choose between risking their lives, or being isolated from essential resources. With a pedestrian bridge, crossing the river becomes much safer, and people are no longer isolated. In 2017, that became a reality for the community of Edlangeni when a 73-metre pedestrian suspended bridge was built within a student project run by Engineers in Action (EIA), a global NGO based in the USA. This footbridge (Figure 1) provides 200 families safe access to schools, clinics, farm fields and markets. This and other EIA footbridge projects have enabled civil engineering students from Universities in multiple countries, including University College London (UK) and University of Colorado Boulder (USA), to apply their engineering knowledge, management capabilities and people interaction skills in a worthwhile practical context.

The success of the Edlangeni footbridge is attributed to the relationship between the many stakeholders involved. Students from the Engineers in Action chapter at the University of Colorado performed the bridge design and planned the construction under the supervision of a registered professional engineer. The project was resourced by various means. These included voluntary labour and annual tax contributions from the community, government funding via Eswatini Microprojects (responsible for much of the country’s rural infrastructure) and EIA funding. The students were at the core of the siteworks, and before that they fundraised through their local networks to cover their travel and living costs, and for contributions to the costs of cables and clamps.

Engineers in Action has partnered with students from over 30 universities in the UK, USA and Canada to construct footbridges alongside rural communities in 11 countries. In 2019, this partnership included students from University College London (UCL) in the UK, led by Signe Swarttouw, alongside students from Rutgers University in the USA. Figure 3 shows the students building a 51 m span bridge across the Mbuluzi River in Eswatini, for the Bhekinkhosi community.

The students worked alongside Bridge Corps members who are experienced bridge builders, local masons and other Bhekinkhosi community members. The bridge opened in late August 2019 after six weeks of construction. The inaugural party was attended by the entire community, including local politicians and chiefs. During the project the students formed bonds with each other and with members of the community, for example see Figure 4. These bonds, like the bridge itself, will greatly outlive the summer construction project and will serve as a reminder of the lasting legacy that is achievable when people come together in earnest for a noble cause.

A key component of the partnership between Engineers in Action and the University students is use of the footbridge
Students with Engineers in Action develop their knowledge of the design and construction of footbridges through a series of synchronous and asynchronous online courses with students from different universities. University faculty are involved in a variety of ways, supporting student chapters as faculty advisers. Some even use these footbridges as capstone projects.

If you are a student interested in using your engineering knowledge to make a difference in the world, a faculty member looking for a real-world project for your students to learn through, or a professional interested in mentoring tomorrow's global engineers, you can find out more by visiting http://www.engineersinaction.org and clicking on the ‘Bridge Program’ tab, or by emailing EIA’s Bridge Program Director at ethan.gingerich@engineersinaction.org.