Students taking GES 473 Engineering Service Learning gain knowledge about other cultures while improving living environments in impoverished parts of the world.

BY MIRANDA BARRETT AND OLIVIA GRIDER

College should be a time of discovery, adventure and embracing new ideas, yet many students have hardly left their home states, let alone the country.

Philip Johnson, associate professor of engineering at The University of Alabama, saw this problem and decided to expose students to different ways of life outside the United States. He founded a UA Engineers Without Borders chapter, now known as Student Engineers in Action, in 2005 so students could put into practice the concepts they learned in class while learning about other cultures. Since then, approximately 80 UA students have taken seven service-abroad trips to Peru, the Dominican Republic and Vietnam, in addition to undertaking domestic projects.

“Most students don’t know about the outside world,” Johnson says. “They’re naive about what the rest of the world is like. I thought it would be nice to direct energy toward a project with staying power.”

During the spring semester prior to each trip, up to 20 students enrolled in GES 473 Engineering Service Learning attend weekly meetings to plan projects and gather materials. In May or summer, they travel to an impoverished area of a foreign country and partner with locals to improve the living environment. While many students in GES 473 Engineering Service Learning are members of Student Engineers in Action, participation in the group and an engineering major are not required to take the class. Students with anthropology, pre-med and other majors are drawn to the experience.

In 2013 and 2014, students collaborated with the nonprofit Nature and Culture International and worked in remote villages of the Maijuna Indian tribe in the Amazon rainforest near Iquitos, Peru.

During the 2014 trip, students tested water in two villages, showed villagers easy water purification methods, conducted a survey and provided education about the importance of clean water. Students also worked with villagers to build two composting toilets. During the 2013 trip, students added solar panels to a visitors’ center and set up interactive exhibits, including a blow-dart practice range. The purpose of the center is to boost the area’s economy and help visitors learn about the Maijuna history, traditions and language. In addition, students tested drinking and cooking water and designed a composting toilet for the visitors’ center. UA students also have installed solar panels and lighting in three Peruvian villages on the Tahuayo River, a tributary of the Amazon River (2008 trip), performed soil and water tests in two villages near Iquitos, installed a generator and a wastewater system for one village and made assessments for a bird-watching tower in the Allpahuayo Mishana Reserve to promote ecotourism (2006 and 2007 trips).

Popular belief points to rainforest destruction as the main cause of water contamination in the Amazon River. While that’s true, the immediate threat to villagers is E. coli bacteria from inadequate sanitation, Johnson says. “Sanitation is an interesting concept in these communities.”
Talley says. “If you put water containing bacteria in a clear 2-liter bottle and set it out in the sun for 24 to 48 hours, the UV rays from the sun kill off the bacteria. It was a cheap, feasible solution that did the job. The villagers were very receptive to the idea, especially when we showed them the test results.”

In the rainforest, traditional pit toilets don’t work because the ground is too saturated to absorb waste. Rainwater toilets are common in the area, but they only work during the rainy season—half the year. “The coolest thing about the composting toilet is that it works year round,” Ramey says.

The above-ground, dry toilets use a primarily aerobic processing system aided by the addition of sawdust and ash, which are plentiful in the villages. The result is dirt that can be used for plants.

Talley, who earned a master’s degree in mechanical engineering in 2014 and now works as a pump-design engineer for a major manufacturer, helped explore the possibility of implementing a water-purification system using ultraviolet-light. Rather than build a sand filter or a permanent structure that would require maintenance and parts villagers couldn’t easily access, Talley says meetings held at UA before the trip were extremely beneficial. Students talked about past work in the area they would be visiting, looked at photos, learned some things to expect and set goals for their trip. “The meetings determined what projects we wanted to do and who was going to be in charge of each one,” he says. “We determined what materials we needed to obtain ahead of time and some to buy in Peru. There were also practice tests run to make sure the water-testing equipment worked.”

Improve preparation and communication skills were two big take-aways from the experience, Ramey says. “When we were five hours down the Amazon, having enough nails and not forgetting our tape measure was vital. You can’t run to Home Depot. You know things are going to go wrong, so you have to have contingency plans.”

Ramey says students had to communicate with Nature and Culture International, which has worked with the tribe longer, and with the villagers in order to achieve the best results. “The technical side needed to work with the reality of social norms so we could build something we would be proud of is also realistic and applicable,” she says.

Johnson says he wants the program to continue inspiring students to reach outside their comfort zones and gain confidence in other cultures. “What I hope is that they come back recognizing what a wide, wide world we live in,” Johnson says. “There are different places—not better, not worse—just different.”

Talley says nothing could have completely prepared him for what he saw in Iquitos and the village where he worked. “The poverty, drugs and crime in Iquitos were overwhelming, but the village was so peaceful,” he says. “The village had more than I expected, but it was nice to see how happy the kids were without iPhones and Xboxes. This experience has changed my outlook on poverty and our way of life in America, where a meal can be found down the street or in your pantry.”

Ramey stayed in Peru an additional seven weeks in summer 2014, working with Natur and Culture International to hold sanitation workshops, build a visitors’ center and provide business opportunities for women. She says her work in Peru has had a direct impact on her career plans. “I’ve learned I want to work with nonprofits in South America,” she says. “I like preserving the environment. I like working with the local people, figuring out how to combine what I’ve learned with what they know and finding what will work. I like bridging that gap.”

To learn more about GES 473 Engineering Service Learning and Student Engineers in Action, contact Philip Johnson at pjohnson@eng.ua.edu or 205-348-2669.