

Tech Abroad

BY CATHY YARBROUGH

Computer science and technology students get a global perspective with unique education abroad experiences that help them prepare for their future careers.

JASMINE HENTSCHEL EXPERIENCED A “TEACHING MOMENT” during her two months in India in 2015 as a graduate student in the University of Michigan’s Global Information Exchange Program (GIEP).

Before traveling to the vast South Asian country, Hentschel and two other University of Michigan graduate students who had signed up for GIEP worked together for five months to plan a technology-based training model for Digital Green, an international nonprofit organization that trains farmers in India’s rural villages to help other farmers improve their agricultural practices.

However, soon after arriving at their client’s headquarters in New Delhi, the three students discovered that the model that they had developed at the University of Michigan “was not going to work,” said Hentschel. “We realized that we would have to take a step back.”

The three students initially could not agree on their next steps on the project, which they had already spent countless days and nights working on in Michigan. “We argued about

whether the plans that we had created in Michigan were usable or whether they should be thrown away,” said Hentschel.

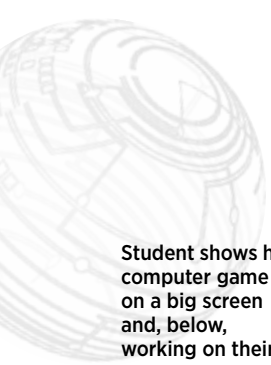
An official of Digital Green who served as the students’ mentor noticed that something was wrong. “It was the look of anguish on our faces,” joked Hentschel. After hearing about the students’ dilemma, the mentor told them to “embrace uncertainty, because it’s part of the process,” Hentschel recalled. “When she said that, a light bulb went off. This was a serious teaching moment for us.

“We all realized that we had learned a lot, but had to start over,” said Hentschel, who was awarded an MS degree in information at the University of Michigan in 2015.

Students who participate in the GIEP are exposed to the kinds of problems that they likely



Jasmine Hentschel (in the red shirt), a University of Michigan graduate student, listens in a meeting with members of a rural village in India about the Digital Green program, an international nonprofit organization that trains farmers in India’s rural villages to help other farmers improve their agricultural practices.



Student shows his computer game on a big screen and, below, working on their games.

will face in their careers, said Joyojeet Pal, PhD, faculty lead for GIEP, which sponsored and oversaw the graduate students' work with Digital Green. Pal also is assistant professor at the University of Michigan's School of Information, which investigates human-computer interactions and other applications of computer science.

In their interactions with their client, Digital Green, Hentschel and the two other University of Michigan graduate students were expected to behave as consultants, and they did, but they were still students, said Pal. "While they're in school, students typically do not obtain a lot of experience in working for clients, particularly those in different cultures. That's not part of the curriculum. As a result, students don't know what could go wrong," he explained.

Computer Science Abroad Programs Connect With Career Preparation Skills

GIEP is one of several study abroad programs that provide students in computer science and related fields with a preview of "what it will be like when they have real jobs and will be interacting with clients. "Clients expect consultants to tow the line and deliver," added Pal. In addition, in the early years of their careers, computer science and information graduates will not be able to choose their clients. They'll be assigned clients and projects. Similarly, in GIEP, Hentschel and her team did not pick Digital Green. It was assigned to them by Pal, based on the students' skillsets and interests.

Relatively few U.S. computer science majors participate in education abroad programs. Since 2003, computer science and math majors have constituted only 1.5 to 2.1 percent of the annual total study abroad enrollment in the United States, according to the Institute of International Education (IIE)'s annual *Open Doors* report, which is funded by a grant from the Bureau of Educational and Cultural Affairs at the U.S. Department of State.

"Computer science tends to have a rather sequential curriculum. There is a fairly long list of courses that students have to take, one after the other, to finish the major,"



said David Liben-Nowell, PhD, associate professor in the Department of Computer Science at Carleton College in Northfield, Minnesota. "Students can find it hard to fit time abroad in among those requirements."

At Carleton, computer science students' education abroad options include the Aquincum Institute of Technology's program in Budapest, Hungary, and the DIS Study Abroad in Scandinavia program in Copenhagen, Denmark.

Dorte Mari Aggergaard, assistant program director at DIS, said that computer science majors have not had an abundance of education abroad options that allowed students to transfer the academic credits that they earned back to their home universities or colleges.

Grant McClure, who was one of the 15 students in the inaugural computer science program at DIS Copenhagen in 2015, said, "If I had not been able to transfer credit, I would have been under a lot of pressure to complete all my courses so that I could obtain my degree on time." McClure,



Students participating in the semester-long computer science abroad program focused on game development in the DIS Study Abroad in Scandinavia program in Copenhagen, Denmark, during their end-of-semester showcase.

a junior at Davidson College in Davidson, North Carolina, is majoring in mathematics with a minor in computer science.

Kelsey Quackenbush, a junior computer science major at Georgetown University (GU) in Washington, D.C., added, “There aren’t many study abroad programs in Europe that offer computer science programs.” Quackenbush also participated in the DIS computer science program in 2015. Taught in English, the program focuses on computer game development, a subfield of computer science and a billion-dollar industry. Because video computer game development is not taught at GU, DIS “allowed me to explore this subset of computer science that I would not otherwise have been exposed to,” she said.

The relatively low education abroad enrollment of computer science majors also may be due to many computer science courses at European universities being taught in the local language, not English, said Evie Zambetakis, vice president of university partnerships at the University of Nicosia in Cyprus. All Nicosia University courses, including those on computer science, are taught in English, she said.

“I also think that most computer science students in the U.S. simply don’t know that they can study abroad,” Zambetakis added. “Once they find out, I think they are interested in the opportunity, but there is a huge hurdle still

in getting the message across to these students. The challenge is in getting computer science departments in the U.S. aware and on board, so that they can encourage their students to take advantage of international opportunities.”

In addition, education abroad programs must compete with paid internships that are available to computer science majors in the United States, Europe, and Asia, said Wayne Summers, PhD, professor and chairperson of the School of Computer Science at Columbus State University (CSU) in Columbus, Georgia “Computer science majors are very career-oriented,” he said.

“In computer science, even juniors can obtain well-paid internships at the types of companies in which they may want to work once they graduate,” said Pal.

When he initiated CSU’s study abroad program for computer science students, Summers discovered that the location of the program also affects enrollment. The first year, he selected India as the site of the program. However, very few students signed up for the program in India as well as the programs in Germany and England that CSU sponsored in succeeding years.

“Finally I asked the students ‘where do you want to go?’ They said Japan, and I said, ‘Okay, let’s go to Japan,’” Summers recalled. Since 2012, CSU’s study abroad program



A viewing of a Digital Green video to local villagers in India; the project was developed with the assistance of graduate students in University of Michigan's Global Information Exchange Program (GIEP), including Jasmine Hentschel, mentioned at the beginning of this story.

has been held in Japan and has succeeded in enrolling 10 to 12 students each year.

"While China plays a more crucial role in the computer science field, it does not speak to computer science students the same way that Japan does," Summers said. Japan appeals to students because of its leadership in game development and because it's the home of anime, Japanese-style computer animation, and manga, Japanese comic books, he explained.

An Increase in Interest in Studying Abroad Among Computer Science Majors

Liben-Nowell identified two factors that could increase the percentage of total study abroad students in computer science. "There's been a tremendous increase in student interest in computer science, so there may be more computer science students who might choose to study abroad," he said. "There is also an increasing sense of the role of computation happening 'in a place,' because so much more of our computation now occurs on mobile devices. It's increasingly easy for students to see the point of doing computation in different kinds of places, around different kinds of people, and for different kinds of people."

Education abroad options for computer science students range from CSU's two-week program in Japan to the four-month DIS program in Copenhagen that includes a one-week study tour to Germany, which is home to the second-largest video game market in Europe.

CSU's academic partner in the program is Teikyo University (TU), which is headquartered in Tokyo and has strong computer science and robotics programs, said Summers. In addition to coursework, the CSU program with TU includes technology excursions to such institutions as NHK Science and Technology Research Labs, the National Museum of Emerging Science and Innovation, and the TEPIA Association for Technological Excellence Promoting Innovative Advances, which is known in Japan as "technology utopia." The students also attend an anime club meeting and tour the Edo Tokyo Museum, and Edo Wonderland.

Raul Esteras, a computer science major at CSU, participated in the university's study abroad program in Tokyo in 2015. "Visiting Japan has been one of my life's goals," he said. "It was an opportunity to complete that goal and have it be relevant to my career. I worked hard and saved money for about over a year to participate in the program." His travel and related costs were partially covered by one of CSU's study abroad grants. These grants are

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funded by CSU students' international education fees. "My short time in Japan with my fellow students, friends, and new Japanese friends is easily the best time I've had in my life so far, and it showed me what time and effort can accomplish," he said.

McClure, the Davidson College junior, said, "The DIS program puts a lot of emphasis on experiential learning. We didn't just sit in a classroom being lectured to."

Quackenbush, the GU student who also participated in the program, said, "DIS is unique in that you travel with your core class to other cities to gain a larger perspective of the gaming industry within Denmark and Germany, which I found extremely enlightening and helpful." While in Germany, the students also attended Gamescon, the world's largest gaming convention.

"By visiting game development companies, we were able to talk with people in the industry and see firsthand what we were learning in the classroom," said McClure. At the DIS headquarters in Copenhagen, Quackenbush and McClure took classes on game development that were taught by Morten Nobel-Jørgensen, PhD, developer of computer games and owner of a computer game publish-

ing company called Kickstart Games. The course included a game development lab where the students created their own games by using the multiplatform game development tool named Unity, which was developed in Denmark.

In Denmark, Quackenbush and McClure participated in a "game jam" at a school, a højskole, which specializes in game development. "We teamed up with the Danish students to create a game and then presented it on the last day," Quackenbush said. "It felt very rewarding to be able to have a final game at the end of the semester that we made using Unity, to have something tangible to show others what we had been working on."

Intercultural Experiences Abroad Aim to Help Future Careers

Education abroad programs for computer science majors, like other overseas education programs, are designed to introduce students to other cultures so that after graduation, they will succeed in the global workplace.

CSU student Esteras said, "I have always been open to working with people from other cultures, and what spending time with the Japanese has shown me is sometimes

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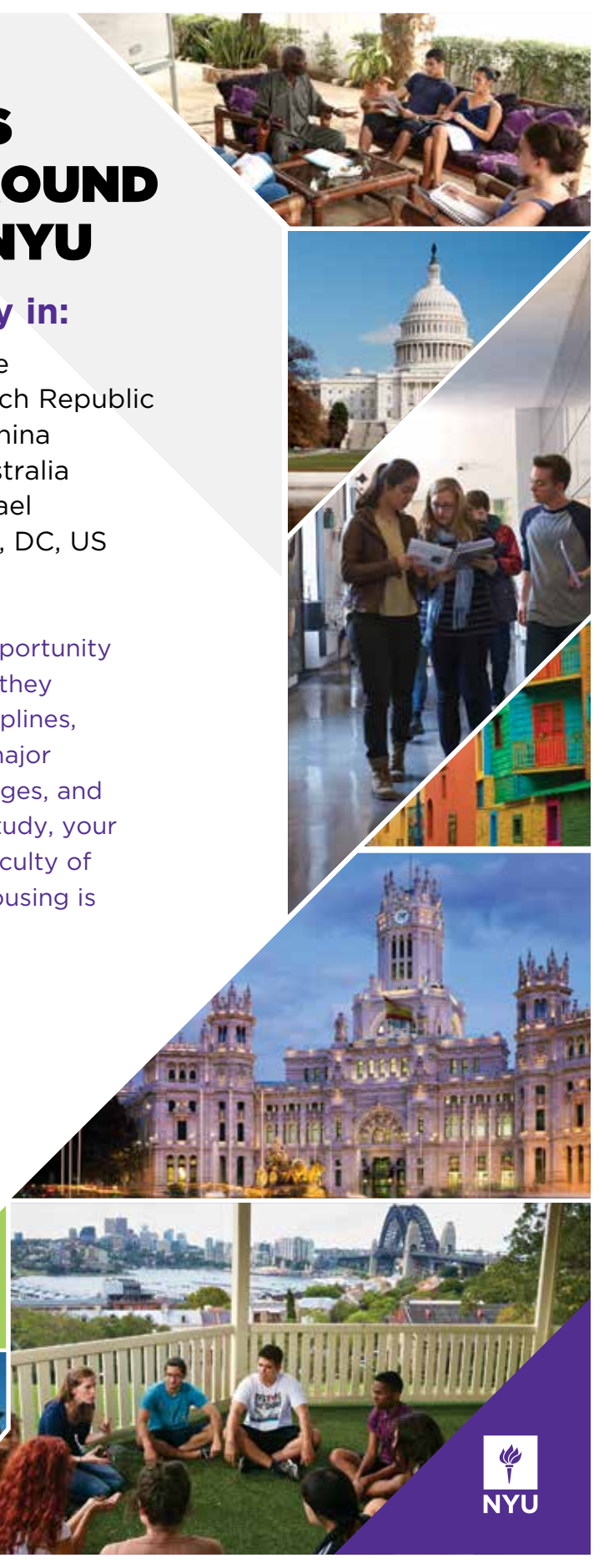
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we're not so different after all." Unlike many students, Esteras had lived and traveled outside the United States.

Unlike Esteras, many students did not have the opportunity to talk with an individual from a different culture before attending college, Summers said. "We tell students that they will be working with people all over the world," he added. "However, it's very difficult for many of them to understand the ramifications—that they will have to work effectively with people who speak with a strong accent, have different religious beliefs, and who view the world differently."

Prior to his study abroad experience, McClure said that he knew that there are cultural differences between the United States and other countries. "But I did not really understand this until the program. It opened up my eyes to the world around me."

Study abroad programs allow students to interact with and learn about people from a different culture in a structured way, Summers pointed out

As a result of participating in the University of Michigan's Global Information Exchange Program in India, Hentschel said, "I now better understand how people solve problems in different settings, particularly those

with constrained resources."

"It was such an amazing experience to be able to immerse myself in another culture for four months," said Quackenbush. "Some of my most valuable experiences involved interacting with both the Danish students at the højskole and the game development employees at the companies in both Denmark and Germany," she said.

During his education abroad program in Copenhagen, McClure lived with a Danish family with five children, ranging from two to nine years of age, who spoke English fluently. The option to live with a Danish family was one of the reasons that McClure picked the program. "They treated me as part of the family," he said. "I ate home-cooked meals, played with the kids, and spent a lot of time in conversations about the cultural differences between Danes and Americans. It was definitely the highlight of my study abroad experience." McClure produced a video titled "Happy Home" about his experiences: <https://vimeo.com/147273381>.

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CATHY YARBROUGH is a freelance writer in Atlanta, Georgia. Her last article for *IE* was "STEM Students Go Abroad for Research and Internships" in the March/April 2016 issue.

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