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Virtual International Collaboration for Community College STEM Programs

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Virtual International Collaboration for Community College STEM Programs

International collaborations for community colleges are important for students who will be competing for employment yet are often overlooked due to the perception that international means expensive. The International Education Initiative (IEI) provides opportunities for international collaboration among community college faculty and students. The IEI is a multi-tiered program that allows different levels of participation and cost for faculty and students through funding from the Connecticut College of Technology's Regional Center for Next Generation Manufacturing (RCNGM) and the French Embassy in the United States. This funding has supported the development of the Connecticut Collaborative Learning for International Capabilities and Knowledge (CT CLICKS).

The RCNGM, a National Science Foundation Manufacturing Center of Excellence, was created in 2004 with funding from the National Science Foundation's Division of Undergraduate Education - Advanced Technological Education Program to educate manufacturing technicians with necessary skills required by industry. The community colleges under the RCNGM continuously partner with other community colleges, universities, industry, and organizations and at the national and international levels to provide support and expertise to students and educators in engineering and technology programs. The RCNGM is overseen by the Connecticut College of Technology (COT), a consortium of all twelve public community colleges in Connecticut, ten public and private universities; technical and comprehensive high schools; and representatives from industry. The COT began in 1995 through state legislation to create seamless pathways in engineering and technology from certificates and A.S. degrees to B.S. degrees. The pathways have multiple points of entry and exit for job placement and stackable credentials for degree completion, including national certifications that have increased enrollments and created program stability. The COT is led by the Site Coordinators Council that meets monthly and consists of faculty and deans from all member institutions and representatives from industry and government to discuss COT programs and meeting the advanced manufacturing workforce needs.

The COT is where faculty recruitment began for CT CLCIKs and while the main focus of CT CLICKs is engineering and technology courses, partners have also included business and communications classes, creating a truly interdisciplinary program. Students participating in these programs can expect to have greater cross-cultural maturity and awareness of the wider world, increased confidence in finding future success in the global workforce, and increased ability to deploy 21st century skills such as technology and teamwork. Faculty participating in the program can expect to have increased confidence and skills to support students in achieving 21st century skills; increased ability to co-teach and work effectively with overseas partners; and more motivation and readiness to sustain overseas partnerships and help grow international programs.

During the first year of the program, faculty from Connecticut community colleges partnered with faculty from French Insitituts universitaires de technologie (IUTs), French equivalent of community colleges, to co-teach curriculum modules to their participating classes. The second

year added the option of co-facilitating a project between the two classes. All teaching, assignments, and projects were completed through virtual platforms. Several travel opportunities have been provided for student and faculty participants. These have either been through the attendance of international technology bootcamps that were organized by the French Embassy, a partner IUT, or through a travel program organized by the IEI. Travel includes experiences that provide an overview of French engineering and technology education, industry, history, and culture. Study-travel opportunities and hosting faculty colleagues and leaders from partner campuses also supply key motivators for funders, students, and faculty. It should be noted that while French institutions are the major partners in CT CLICKs, a program was done with La Salle University in Mexico and the program can be adapted for partners from any country.

The first critical component of successful CT CLICKs is dedicated faculty. A faculty recruitment and preparation model was created to continuously onboard new faculty for the IEI program. The model includes a program overview workshop, partner matching, and curriculum design workshop that all take place virtually. The CT CLICKs program has built steadily and quickly. The number of teachers participating grew from 6 to 29 in the first three years with more than 6 teachers repeating or developing new modules. A total of 334 students have participated in the CT CLICKs program since fall 2017. The number of Connecticut campuses grew from 1 to 8 and overseas partner campuses grew from 2 to 5.

Participant survey data shows that the program is continuously improving in helping students gain a better worldview and collaborate cross-culturally and helping faculty incorporate international collaboration into their courses. Teachers running a module for a second or third time are more likely to involve a full class, rather than a section of their class. It is worth noting that the retention rate for CT CLICKs teachers (those who have continued and/or plan to continue in the future) is currently 90%.

Furthermore, in the face of the pandemic, CT CLICKs became one of the only options for providing robust global skillsets. Students were still able to enhance cross-cultural skills, including intercultural communication and working across time zones through the CT CLICKs modules that ran in spring 2020. Additionally, students and teachers found the projects motivating and looked to CT CLICKs for social interaction and collaboration in times of physical isolation. Without the possibility of travel, the CT CLICKs virtual exchange initiative has become increasingly important as a way of providing an international education to Connecticut community college students.

Student Outcomes

CT CLICKs provides the opportunity for students to receive a global experience as part of a course they are already taking. CT CLICKs has three student learning outcomes. After their CT CLICKs experience, students will demonstrate: (1) greater cross-cultural maturity and awareness of the wider world; (2) increased confidence in finding future success in the global workforce; and (3) increased ability to deploy 21st century skills through technology and teamwork.

The overall data reveals largely positive outcomes. Both quantitative and qualitative data was collected through student and faculty surveys and debriefings. These qualitative results were

particularly important guides for the leadership team to adjust the program training activities and support year to year.

Overall, students believe cross-cultural collaboration is important for future success in the global workforce, which is a key indicator of how well students are reaching the second and third goals outlined above. This relates to finding future success in the workforce and confidence in deploying 21st century workforce skills such as teamwork. The results suggest that students in Year 3 had more fully reached these goals than any previous year of CT CLICKs, reflecting a strengthened and continuously improving program. The improved results in Year 3 are attributed to a restructuring and redesign of faculty training materials which are presented in the training manual delivered in fall 2019. In early fall 2019, workshops and associated resources were redesigned to include a greater focus on student goals, the student and team building experience, and creating ways to develop workforce skills within the CT CLICKs classroom-based module.

Students also developed a broader worldview through the CT CLICKs program as learned through questions relating to the ability to work in teams and cross-cultural maturity. Students in CT CLICKs classroom projects adjusted their expectations, showing a more realistic understanding of the challenges posed by cross-cultural collaboration. It is notable that less than 40% of all the Connecticut students had traveled abroad in their lives while over 60% of the students abroad had traveled internationally. CT CLICKs is an opportunity to provide an interactive global experience for students who are unable to physically travel to another country.

Learning outcomes 2 and 3 involve learning new tech tools and navigating collaborative technology-based projects to better prepare CT CLICKs students for success in the future workforce. Technology and teamwork blend together in a CT CLICKs project in particularly important ways. There is no way to communicate with teammates abroad without the technology. Students felt comfortable with their technological skills before the CT CLICKs classwork. The post-CLICK responses suggested that they realized using technology to produce a final project deliverable required them to learn new technology skills or apply them in new ways. In one of the first CT CLICKs projects, with a large student group and more than 5 teams of 5-6 students, the faculty felt that the students did not form bonds or team spirit in the way the teachers did. Part of the diagnosis was the team-technology interdependence had not been factored into the teaching design sufficiently. Adjustments were made in the second and third years to provide further support for teachers to help students develop trust and a sense of camaraderie. This included building technology problem-solving into early team building efforts in the CT CLICKs projects. This underscored the need to focus early on bonding and team formation among students, well beyond a simple ice-breaker exercise. In Year 3, more background and support was provided for the teachers' choice of apps and technology to promote true interaction rather than independent coordinated work. Overall, the responses to these technology challenges can be viewed as a positive way for students to build their skills and capacities to overcome challenges.

Students had high hopes for maintaining new connections with their international peers. The post- CT CLICKs responses regarding connections have improved in the past three years. The redesign of training materials added a significant emphasis on creating team building and social interactions among students as part of the CT CLICKs project. Roughly 50% of the students in Year 3 "agree" or "strongly agree" they have made lasting connections. Many teachers realize

the students would have benefitted from further social interactions. Using that feedback, teachers are encouraged to spend time on team building and relationship building, not just content.

Students thrived in overcoming challenges. These results are particularly illuminating because it showed that what was challenging and what was rewarding were very interconnected. Students stated that communication was a barrier, but many students also reported that learning to communicate better across time zones and languages was also rewarding. Furthermore, some students found collaboration difficult, but far more reported that working together was the most rewarding part of the CT CLICKs experience. In the end, it was actually a positive outcome that students were challenged by time zones, communication, project management, and technology because these are all the skills that we are hoping students will develop through their time in the CT CLICKs module. Although the time zones were difficult, they found ways to communicate and manage that obstacle given the fact that connecting with students was among the most rewarding aspects of the experience. The large number of students who wrote about the reward of meeting people and making new friendships further supports the quantitative data that shows that students make lasting connections that they will hopefully maintain beyond the CT CLICKs module. The qualitative results also inform the faculty training because it was determined that communication was one of the biggest challenges, which was then factored into training redesigns.

Faculty Outcomes

The three goals for faculty development through the CT CLICKs program are: (1) Increased confidence and skills in faculty to support students in achieving 21st century skills; (2) Increased ability to co-teach and work effectively with and overseas partner; and (3) More motivation and readiness to sustain overseas partnerships and help grow the international program.

Overall, teachers found that the CT CLICKs modules were valuable and provided additional learning and personal growth among their students. The high rate of faculty retention, as well as generally positive survey responses, demonstrated that teachers found it worth continuing participating in CT CLICKs. They tended to find their teaching partners enjoyable as colleagues, would plan to work with them again, and wanted to conduct exchange visits to deepen their work together. The teachers' satisfaction was higher in Years 1 and 3 than in Year 2, largely because of platform problems with the second cohort. Training and advice on technology and teamwork learning strategies were adjusted. The CLICKs Design Workshop for Year 3 was also redesigned. Initial positive feedback from fall 2019 and spring 2020 teachers suggests that the new framework is better suited for helping these master teachers adapt their strong skillsets to the new requirements of CT CLICK's two-country, team-based projects and helping students adapt to the new ways of learning and interacting with overseas peers. CT CLICKs has enabled innovative teaching by enabling faculty to cross disciplinary boundaries to create new learning projects and promote team-based project learning.