

paths, leading them to take an interest in more courses in different disciplines. The pandemic delayed one participant's research on local farmers, but a conversation with a mentor led to new ideas about incorporating COVID-19 impacts on local farmers into her research. Another participant's community-based opportunity was canceled, but mentoring enabled her to use this time to search for graduate school programs and provided a safe space to discuss her future plans frankly. Overall, many of the participants expressed a sincere gratitude for this mentoring approach, strongly recommended that other students participate in the program, and even appreciated simple conversations with mentors, especially during the disruption caused by the COVID-19 pandemic.

Adapting an Interdisciplinary, Course-Based Undergraduate Research Experience (CURE) Course to an Online Format

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Elmhurst University has developed an interdisciplinary, course-based undergraduate research experience (CURE) funded by the National Science Foundation (NSF) that has been taught for the last eight years as part of the KEYSTONE (KEYs to Success through Year ONE) Program (Guenther, Johnson, and Sawyer 2019). This CURE-focused course, known as the Science Bootcamp, emphasizes the scientific process rather than content. Mentored by a faculty member, interdisciplinary teams of students select a topic area, develop a hypothesis, design and execute an experiment, draft a manuscript, and orally present to the larger community in an on-campus poster session. Consistent with the larger goals of the KEYSTONE Program, the Science Bootcamp promotes the success and retention of STEM students via cognitive, affective, and psychosocial gains (Majka et al. 2020).

In the past, the Science Bootcamp was conducted only during the university's four-week January term with traditional first-year undergraduates in STEM. However, transfer students represent another category of first-year students who need tailored STEM support services, particularly as they cope with "transfer shock"—academic and social challenges that can undermine transfer student success in the long term (Cejda 1994; Larkin and Elliot 2016). Given its success with traditional first-year students, the Science Bootcamp was redesigned as a two-week CURE in August for STEM transfer students to complete prior to beginning their first fall semester at the university. It is hoped that the August Science Bootcamp will help STEM

transfer students overcome "transfer shock" and thrive at the institution.

August 2020 marked the inaugural year of the CURE Science Bootcamp course. Due to COVID-19 restrictions, the entire bootcamp was taught virtually on a synchronous schedule using the learning management system Blackboard Collaborate Ultra. STEM transfer students completed all key elements of the traditional Science Bootcamp, with slight modifications due to the compressed schedule. In topic selection, students were nudged toward viable methodologies, given that in-person data collection was prohibited. In collaboration with a faculty mentor and an upper-class peer mentor, interdisciplinary teams of students conducted a wide range of projects, including the bioinformatics of cancer, an online behavioral science experiment, and geometric morphometric analysis of fossils. The bootcamp culminated with students presenting their findings to the campus community at the August Science Bootcamp Poster Symposium on Blackboard Collaborate during the first week of fall classes.

Overall, anecdotal evidence suggests the course was a success, although several challenges needed to be overcome. With the shortened timeline and virtual experience, it was necessary to have more intensive faculty mentoring of projects compared to previous face-to-face iterations, which were not anticipated. Furthermore, because this was the first year conducting this type of bootcamp, the peer mentors did not have experience with these projects, which affected their level of effectiveness. For those considering conducting a CURE-type course virtually, training peer mentors in relevant techniques for virtual data gathering and analysis is recommended so that they can more actively assist student groups and faculty. Finally, to foster a more cohesive online learning community, icebreaker activities began to be incorporated each day so that the members of the entire class could connect to each other, not just to members of their own research groups.

The virtual Science Bootcamp CURE model is readily adaptable to fit the needs of other institutions. More broadly, it is a feasible model for supporting students if bringing them to campus physically is not logistically possible. Indeed, the August experience suggests it is possible to design and execute an effective CURE experience, no matter the delivery format.

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References

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