Is A Framework of Support Enough? Undergraduate Research for Online STEM Students

Abstract

While undergraduate research is well known as a high-impact practice, very little research has been reported for the online educational setting. Early research suggests that online students and faculty have similar interest in undergraduate research as their residential (face-to-face) counterparts. This point of view presents the framework of support developed for fully online students distributed globally and shares some of the challenges faced, including the issue of low recruitment (despite stated interest) that could be exacerbated by the COVID-19 pandemic.

Undergraduate research is widely considered a high-impact practice, with many well-reported benefits to students, faculty, institutions, and disciplinary fields (Kuh 2008; Lopatto 2010). Until recently, little research emphasis was placed on understanding this practice for online and distributed students. Online students may be underrepresented due to variety of reasons including institutional factors (e.g., prevalence of research-engaged faculty or institutional support) and environmental factors, including students' professional responsibilities. Institutions now must wrestle with these barriers as more students seek high-impact experience from a distance. Even prior to the pandemic, online students were no less interested in participating in undergraduate research than residential students (Faulconer, Griffith et al. 2020, 48-59). Similarly, online and residential faculty had a comparable level of interest in mentoring undergraduate research (Faulconer, Dixon et al. 2020).

When we first approached undergraduate research for fully online STEM students, we were well positioned to do so as it was pre-pandemic and we were operating from a campus that was already fully online with distributed faculty and students. Our goal was to increase students' disciplinary learning and transferable skills, persistence and degree retention, and to improve science, technology, engineering, and math (STEM) identity and attitudes through undergraduate research experiences. We established a comprehensive network of supports based on best practices, including a long-term research mentorship program, disciplinary communication assistance through the institution's virtual communication lab, research-focused synchronous workshops, an independent study-style course-based undergraduate research experience (CURE) that offers credit for research activities as an elective in their degree program, and virtual access to participate at the annual internal student research conference. This project is supported

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Early challenges were administrative hurdles. The first challenge was securing approval to adapt an undergraduate research certificate program from the residential campus to students completing online degree programs. Next, there was some resistance to offering a research-based independent study course when standard independent study courses were already available in the catalog. Finally, there were administrative responsibility and workload allocation questions when expanding an existing career-focused mentoring program to include research mentoring. Launch challenges for the research-based mentoring was compounded by the fact that the mentoring program was housed in the College of Arts and Sciences, while the research mentoring would be available to students completing any online degree program at the institution.

An unexpected we are facing is the recruitment of students into the program. We hoped that "build it and they will come" would apply. That is yet to be seen, despite the strong interest expressed by online students and faculty when surveyed pre-pandemic. Currently, the reasons are unknown, but we can make some educated guesses from the most recent research on the pandemic's impact on students. Some concerns STEM students reported about learning from home during the pandemic include difficulty focusing, lack of hands-on experience, and loss of social interactions (Palmer et al., 2021). Students have reported a decline in positive attitude towards science and a reduced perceived value of the science learning (Wester et al., 2021). Build it and they will come appears to be an inadequate strategy for program recruitment in the modern climate of higher education. Educators who wish to offer these types of high-impact experiences may want to consider how they can address complex internal personal and psychological factors.

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