

### **3.4 Objective 3– Expanding current research experiences for KCC students**

#### **3.4.1 Research in the classroom– data-centric CUREs**

Relatively little is known to date about the implementation of CUREs at two-year institutions [Wolkow et al. 2014]. Our initiative stands out through its **focus not only on traditional STEM disciplines but also because it will provide research experiences to students from majors not typically associated with STEM, but categorized as such by the NSF**, such as linguistics, social science, and cultural anthropology.

Quantitative skills are most effectively learned through real-world data analysis, active learning, and the use of technology [Burdette & McLoughlin 2010, Howery & Rodriguez 2006, Scheel 2002]. Previous work shows that grounding research in students' experiences from real life research training is an effective practice [Laursen 2015, Matthews 2014]. Faculty will select research topics that reflect their discipline but are anchored in current affairs and related to issues of high visibility in the media to increase the likelihood students will find them interesting. For example, the PI's mentees have recently conducted experimental work in which monolinguals and bilingual participants were asked to play the popular Wordle game testing the hypothesis that word retrieval is slower in bilinguals than monolinguals.

Each student will have the opportunity to complete a portion of the data collection process, sufficient to extract descriptive statistics from, but also compatible with data collected by the other students in the class so that a statistical test (e.g. regression or analysis of variance) can be conducted by the instructor using all of the available data. Each individual student will make a unique contribution to the larger class project which will integrate multiple data sources for a bigger picture and deeper insights into the phenomenon of interest. Upon completion of the CURE, students will have learned how to: (1) develop a research question, (2) formulate a hypothesis, (3) identify primary sources to support their work, (4) conduct a research protocol (observation, quasi experimental or experimental work), (5) generate descriptive statistics using the data collected, (6) understand data represented in a form commonly used in science (text, table, graph).

As discussed in Section 3.3, during the first summer faculty development program, we will create a common rubric to determine if students meet the above competencies. Students who meet all six objectives will receive a Research Experience Level 1 badge of achievement. These competencies are aligned with several of our College's general education learning outcomes and these outcomes are assessed as part of KCC's scheduled assessment cycle. KCC is working to have badges and other microcredentials appear on a student's co-curricular transcript.

Students will have the opportunity to present their findings to a number of different audiences. During the spring semester, we will organize the Student Research Day event, which will be subsidized by KCC with the exception of speaker honoraria. Students who completed a CURE will be given the opportunity to present their research findings as a poster or oral presentation. To encourage student participation, lunch will be offered at this event and faculty may choose to offer extra credit in their courses to presenting students (with an equivalent option for students who choose not to present). An invited speaker will discuss the benefits of participating in UREs; a scientist will talk about their career path and STEM career opportunities. Former student participants will be invited to talk about their experience in the program. We will conclude with a workshop for students to complete applications for the research programs they learned about.

For the INTREPID project, the CUREs have been strategically placed for students to participate in before K-CORE so that a broader pool of students will be exposed to research experiences and develop the skills and knowledge that help them gain access to UREs [Bangera & Brownwell 2014, Thompson et al. 2016] since it is known that UREs tend to attract a self-selecting group of students [Archer et al. 2015, Auchincloss et al. 2014].

The proposed project has far-ranging implications. With each faculty member teaching two redesigned courses per year, a total of 50 courses will be transformed to include a research experience.

With up to 24 students per section, the total number of students potentially impacted by this practice exceeds 1,500. Since faculty from year 1 and 2 will expand their CURE to another course in subsequent years, the total number of students involved will ultimately be much higher.