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Kimberlyn Williams CD Summer 2019

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Recommended Citation

Williams, Kimberlyn, "Kimberlyn Williams CD Summer 2019" (2020). *Innovative Course Redesign Grant Reports*. 60.

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DATE SUBMITTED: January 15, 2020

Project title: Flipping the Classroom for Plant Identification and Botanical Skills

Project Goal: The goal of this project is to "flip" the classroom for instruction in six topics covered in BIOL 319 (Local Flora) by developing online learning modules for them. The new learning modules were designed to facilitate better student learning by replacing standard lecture delivery with more interactive, online learning modules. This approach should better prepare students for hands-on in-person lab instruction, practice, and discussion.

When Implemented (Quarter the course was taught): This course will be taught Spring 2020

Brief Description of the Project (as described in the proposal):

"The goals of the proposed project are to develop six online learning modules for BIOL 319 (Local Flora). These topics, historically presented as lectures, will address concepts students need to know to identify plants (variation in flower morphology and anatomy, fruit anatomy and classification, leaf shape and surface features, and inflorescence variation). They will also address uses and preparation of herbarium specimens in botany. These topics may be more effectively taught through interactive online lessons than as in-class lecture. The effectiveness of these modules will be assessed by comparing student performance on exam questions and on assignments related to these specific topics to similar data from nine previous course offerings. These modules will help flip part of this course as we transition to semesters, when the lecture component of this course will be reduced and a discussion section added." ... "Each of these units would be created as a SoftChalk lesson and incorporated into Blackboard. SoftChalk allows embedded comprehension questions, allowing instantaneous feedback to students. Units 1-4 address anatomical variation, and would require use of images. I plan to use a combination of drawings from out-of-print floras (specifically, *An Illustrated Flora of the Pacific States*, published in four volumes by Stanford University Press) and photographs I will take to illustrate various anatomical and morphological characteristics. Permission to use drawings from existing floras will be obtained from the publisher. "

How the Project was Implemented (including how it differed from original plan):

The six units have been developed in preparation for the class offering in Spring. Sources of illustrations for the modules were expanded to include original drawings and images of herbarium specimens, in addition to the published public domain images and original photographs of structures. Much of the summer was spent on a different, but related project: digitizing all of the herbarium specimens in the CSUSB Herbarium in collaboration with staff from other herbaria in California. Although this was a monumental undertaking, it provided this course redesign project with an almost limitless source of images on plant shapes, flower arrangements, other plant features, and herbarium specimen samples that are the subjects of the six modules developed under this grant. This has lessened my reliance on published artwork,

allowing us to use our own images more extensively for lessons and related comprehension questions.

Results of the Project (actual or expected): I expect students to perform better on the first midterm, particularly questions related to the subjects of these modules, than previous students have in the past. I expect both average scores and the fraction of students scoring well on questions that target specific learning outcomes to rise in Spring of 2020. Additionally, I expect students to make fewer errors on their plant collections (collections of herbarium specimens that students are required to make). I expect those collections to be of higher quality, and I will test this by comparing scores from this spring to those from collections in previous years.

Additional Comments (Lessons Learned, Insights, Future Plans, etc.)

Lessons learned:

- 1) It is faster and easier to make your own drawings for a SoftChalk Lesson than it is to hunt through the literature or public domain images for appropriate images.
- 2) A well-crafted introduction and navigation system helps guide a student. (This was actually learned from taking an online "Quality Matters" course this fall to prepare me for online instruction.)

Future plans: After this spring, this course will change format to include only one lecture hour per week and to include a new discussion section. The development of these modules should greatly facilitate instruction under this new format, where lecture is de-emphasized, and may eventually lead to further development of a hybrid model with online lecture material followed by discussion and lab that rely on that material.