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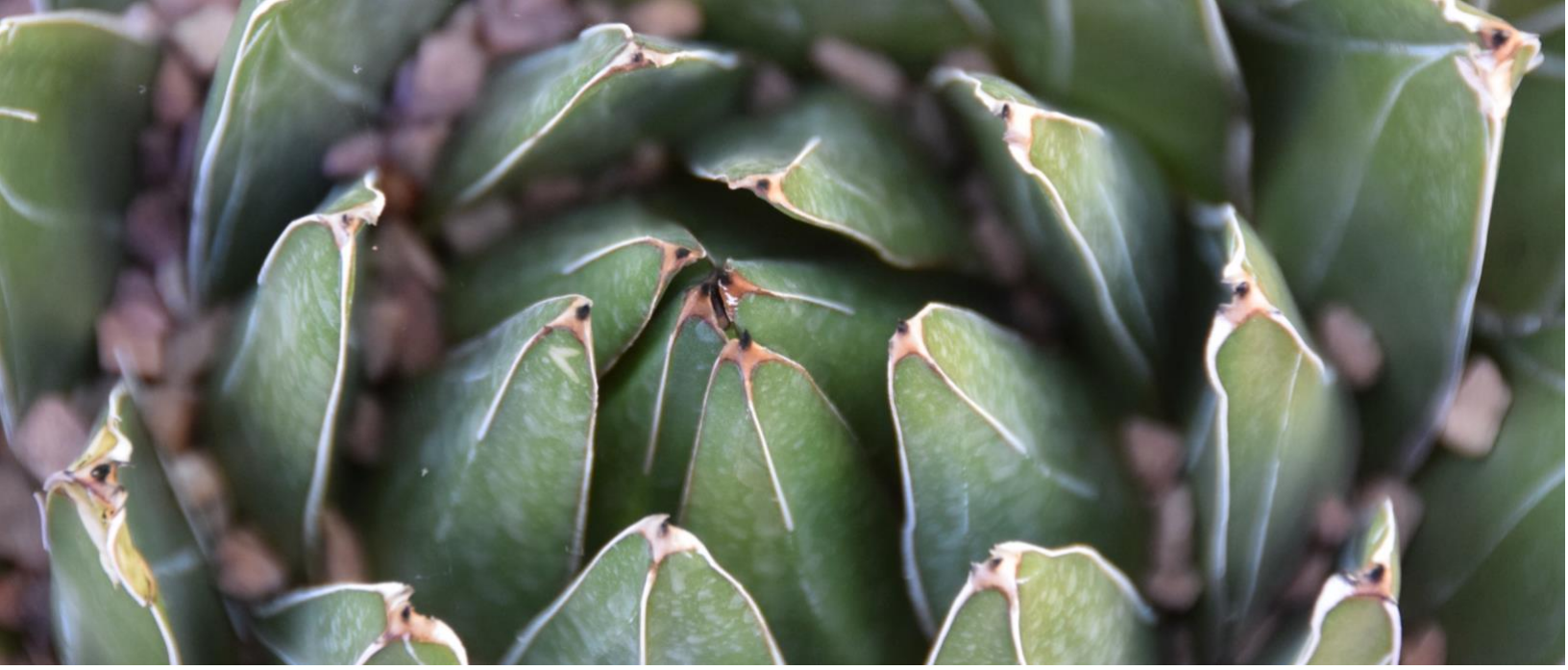

Transforming a BIO 102 Final Project into a Multimodal Assignment

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The goal of the University of Kentucky's general education program (UK Core) is to broaden a student's view of their community, be it globally or locally, and discover their role within it. To achieve this goal, students enrolled in Core classes are expected to be able to demonstrate proficiency in the four UK Core Learning Outcomes. Students have a lot of choice when it comes to selecting Core courses but, many of them choose Biology 102-Human Ecology, to satisfy Learning Outcome I which specifies that "students will demonstrate an understanding of and ability to employ the process of intellectual inquiry." BIO 102 is a three-credit course designed to teach non-biology, degree-seeking students scientific literacy by focusing on the nature of science, the theory of evolution and current biological issues. A major component of BIO 102 in past iterations of the course was a written research project focused on individually gathered, simulated scientific data. However, issues with delivery and execution of the project inspired me to reconsider the assignment design and modality.

Rethinking Research Projects with Access in Mind

First, the project used simulation software provided at a cost from a biology education company. While the cost for the software seems minimal to some, it can be prohibitive for other students. To support access and inclusion, my BIO 102 course relies on free, open educational resources (OER). Therefore, requiring students to pay for access to simulation software did not align with my course goals. In addition, the platform for using the software is not available for cell phones, iPads, or Chromebooks, representing another barrier to student access for those who only have access to these types of devices. This problem is alleviated when providing access to data through a web browser. Second, the project historically was completed individually which meant that students had little interaction with each other during the process. Students are taught in BIO 102 that science is a collaborative process and in an in-person environment, we work together throughout the semester to exemplify this. To solidify this concept, a collaborative research project assignment supports how science is conducted. Lastly, the format of a traditional, written research paper limited students' abilities to think creatively and thoughtfully about the communication of findings to a broader audience. In line with my goals of access and inclusion, I wanted to redesign the research project as a multimodal assignment in a way that was more applicable to students' needs.

The issues and solutions outlined above provided an opportunity to re-envision the research project assignment. While the disciplinary underpinnings of the assignment remained mostly consistent, the focus of the assignment was re-envisaged, and execution of the assignment became vastly different. Rather than asking students to write two essays about research they conducted in a simulated biological community, students were tasked with working together in small groups to create a digital poster that effectively conveyed an existing scientist's research. The students provided a claim about the work and used data that that scientist had collected as supporting evidence for it. Students used free research data from Michigan State University's Data Nuggets project. The shift in assignment modality and focus allowed students in non-majors to focus more on how scientists back up their claims using evidence rather than the details about hypotheses, methodology, and results. While these tenets are important in science-major classes, in non-major classes students are well served by focusing more on the public-facing nature of scientific findings.

Scaffolding the Multimodal Assignment in the Learning Management System

Replacing the written research project with a digital poster required enhanced course structure and intentional scaffolding of the tasks/concepts. I sought to establish that course structure within the course's Canvas shell by creating an organizational path with a navigational video to help students find the necessary tools. I also scaffolded assignments in content and group meeting modules. For example, three content modules are listed in my Canvas shell for BIO 102 with the first focused on

the nature of science and the conceptual framework of Claim, Evidence, and Reasoning (CER). This module served as the backbone to the research project because much of what students learned here, they applied to the final project assignment. Students practiced using CER three times during this module and at each time the level of complexity increased.

I also used the structured Canvas modules to facilitate group meetings and encounters for collaboration. The first meeting was strictly a "get to know each other" meeting, the second meeting served as a checks-in on whether students had read the research project rubric and in the third meeting students chose the research they wanted to investigate and answered questions about it. These meetings gradually built up the group interaction and helped direct project progress by asking more specific questions with each meeting.

Lastly, I included a project module where students found research ideas they could choose from and resources to build their projects. Since the project was due at the end of the last content module which examines human-environment interactions, each research study choice included a human-environment component effectively aligning the content in the research project with the last content module. Within the research project module, videos on how to create a poster using Google Slides, PowerPoint or Canva (See fig. 1) were included to support students' poster creation.

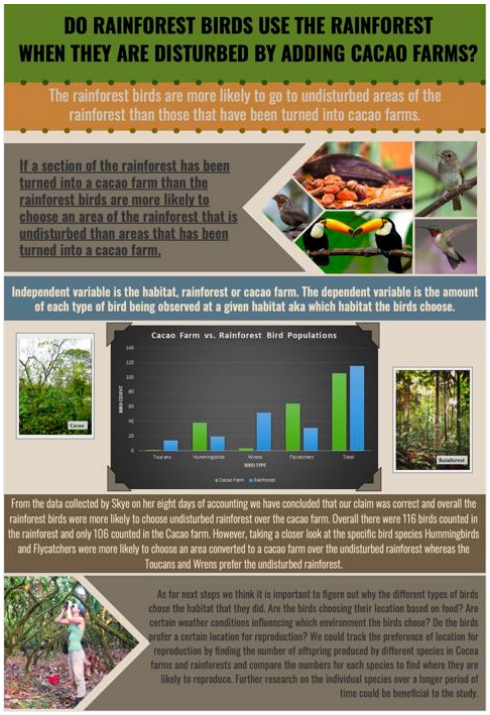

Fig. 1 Example of student group project using Canva

Results and Takeaways

While I was happy with the execution of the research project and the course structure built around it, it was important for me to know if students felt the same way and if there were things I needed to change for the next iteration. Significantly changing an assignment from one semester to the next can be a risk but the risk pays off if the objectives are attained successfully. The changes I made to the research project assignment were meant to enhance student interaction, maintain OER status and support the multimodal style of the course. To obtain students' perceptions of the project and its implementation I used a student feedback survey facilitated by CELT at the end of the semester. With respect to group work, students on average thought that the group meetings helped them prepare for the research project but that they might benefit from additional group meetings. In addition, communication was easy among group members and the work was divided up evenly. With respect to the project itself, students, on average, agreed that the resources provided to build their projects were adequate, that the instructions were clear and that this would be their preferred mode of delivery over a written or video-based assignment. Lastly, with respect to course structure students, on average, agreed that they could easily navigate the course and find information easily. Overall, the student survey results were informative and positive with respect to the project.

In future iterations of the research project assignment there are a few things that could be modified. First, I would like to provide more choice with respect to the research studies students choose from. Currently, they have the choice of five different research studies. However, there were a couple of studies that students seemed to gravitate toward so submissions were heavily biased towards those. With respect to groups, even though group work worked well for the majority of the class, slightly smaller groups may improve communication and delegation of tasks. Related to that, an additional group meeting assignment that focuses on allocation of duties may make group work more effective.

Transforming traditional assignments to a multimodal format for a digital environment can be a massive undertaking for instructors; however, the result of such an endeavor can be immensely rewarding. From the student perspective, a digital multimodal assignment can improve alignment with learning styles and enhance interaction among students. From the instructor's perspective, deviating from a single-mode assignment can not only support learning objectives better but advance inclusivity.

References

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Media

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Croteau, Emily. Photograph of student group project using Canva. 2020. Photographer's personal collection. All rights reserved.

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