The Good, the Bad, and the Ugly: Using Exemplar Papers to Improve Students’ Ability to Self-Evaluate with a Rubric

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The Good, the Bad, and the Ugly: Using Exemplar Papers to Improve Students' Ability to Self-Evaluate with a Rubric

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ABSTRACT
Research suggests that providing students with a rubric increases scientific writing skills; however, we have found that the quality of scientific writing in a course-based undergraduate research experience (CURE) is poor even with a detailed rubric. We tested whether requiring students to use a rubric to evaluate high-, intermediate-, and low-quality examples of de-identified student writing improved students' ability to self-evaluate scientific writing using a rubric. We found that providing students with exemplar papers along with a writing rubric improved the students' ability to self-evaluate, and ultimately improved the quality of scientific writing in undergraduate students enrolled in a CURE.

METHODS
This study was conducted with the informed consent of the 49 students enrolled among 3 sections of BIO203L during the Spring 2019 semester. BIO203L is the lab portion of a core biology course and is conducted in a CURE format in which students work in small groups to perform actual research and write a scientific paper, focusing specifically on the introduction section. Of the students enrolled, 80% were freshmen and 20% were juniors.

RESULTS

INSTRUCTOR EVALUATIONS OF STUDENTS' SCIENTIFIC WRITING

Score: 1st Draft

Fig. 1 – The rubric used in BIO203L is a version of the Research Across the Curriculum rubric modified so that the top score is in the "Developing" category and the required elements are listed specifically.

Fig. 2 – Despite the detailed rubric, students did not score well on their first draft of an introduction to a scientific paper.

STUDENT EVALUATIONS OF EXEMPLARY PAPERS

Fig. 3 – Using the rubric, students scored moderate-and low-quality example introductions to scientific papers higher than did instructors, suggesting that the students were not using the rubric appropriately.

CONCLUSION
This study suggests that a rubric alone is not a sufficient tool for increasing undergraduate biology students' scientific writing skills. However, we found that providing students with exemplar papers along with a writing rubric improved the students' ability to self-evaluate, and ultimately improved the quality of students' scientific writing skills.