The Premier Undergraduate Neuroscience Journal

Impact of publishing in IMPULSE on student learning

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Introduction

In a previous FENS report (2010) we described a neurobiology course at Ursinus College that integrated submitting a manuscript to IMPULSE as part of the syllabus. The students carried out original, drug effects research on D. magna for their class, and then analyzed and wrote up their work, submitting it to the journal at the end of the course. The current report presents the data that was collected after this process, examining the impact of this experience on the students.

Fifteen of the 20 students indicated that writing a paper to be submitted to a peer-reviewed journal played a positive role in their experience with the laboratory exercise, some noting that they were more thoughtful about their experimental design. They also reported that they were more diligent in implementing the experiments. An important observation was that the majority felt that submitting a paper to a peer-reviewed journal increased their engagement in exploring the topic.

Figure 1: Quantitative analysis of time spent writing a scientific paper for a peer-reviewed journal. Results from a student questionnaire are shown. White bars indicate time spent on a paper submitted solely to the professor. Black bars indicate time spent on a paper submitted to a peer-reviewed journal. The pair of bars labeled “First submission” represents the time students spent preparing a paper for submission. The pair of bars labeled “Revision” represents the time students spent revising a paper after receiving comments. Fifteen students completed the questionnaire.

A further advantage not usually experienced by undergraduates was responding to peer review comments. This form of collaboration with peer scientists is an under-emphasized skill for all future science professionals and one the students appeared to appreciate. For the Instructor, including the process of manuscript writing, submission, and revision into the curriculum of the course provided the students with a full-scale model of the research experience, from experimental design and planning, through manuscript preparation and publishing, which they found very valuable.

Conclusion

Since student engagement is a key factor in learning and academic success, these results indicate that using IMPULSE to focus student interest and ownership in their learning can be a useful tool to enhance neuroscience teaching. Almost 87% of the students taking the course indicated that they were more engaged in learning the scientific concepts because their work would be submitted to the journal, illustrating that this trial was successful in increasing students’ investment in the course.

History of IMPULSE

Since student engagement is a key factor in learning and academic success, these results indicate that using IMPULSE to focus student interest and ownership in their learning can be a useful tool to enhance neuroscience teaching. Almost 87% of the students taking the course indicated that they were more engaged in learning the scientific concepts because their work would be submitted to the journal, illustrating that this trial was successful in increasing students’ investment in the course.

Figure 2: Quantitative analysis of student engagement in a scientific study when writing for a peer-reviewed journal. Results from a Likert-style questionnaire are shown. Bars represent the mean of students’ responses to questions shown in Table 1 comparing their effort in a course for which a paper was submitted to a peer-reviewed journal to their effort in a course for which a paper was solely submitted to the professor. A score of 1 indicates less time, effort, or thought, a score of 3 indicates that the students were more thoughtful about their experimental design. They also reported that they were more diligent in implementing the experiments. An important observation was that the majority felt that submitting a paper to a peer-reviewed journal increased their engagement in exploring the topic.

With 1: Quantitative assessment of student engagement in experiments and writing for a peerreviewed journal.

Compared to papers of similar length you have written for other biology courses, choose a number for each of the questions below. "1" indicates that your response is the same compared to other biology courses, "4" indicates that your response is much less compared to other biology courses, and "5" indicates that your response is much more than for other biology courses.

1. How much time did you spend drafting 4.3 ± 0.2 background reading for the paper?
2. How much effort went into experimenting 4.7 ± 0.1 planning for the paper?
3. How much effort went into completing the 4.6 ± 0.1 experiments for the paper?
4. How much effort went into understanding the 4.7 ± 0.1 implications for your findings for the paper?
5. How much thought did you put into presenting 4.7 ± 0.1 understanding the meanings of your findings?