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Motivating Students to Learn Biology Vocabulary with Wikipedia †

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INTRODUCTION

Timely learning of specialized science vocabulary is critical for building a solid knowledge base in any scientific discipline. Lack of adequate terminology fluency is considered a major obstacle for reading comprehension of scientific texts and learning in the sciences (2). Without a doubt, students with good vocabulary knowledge master the material faster, communicate their knowledge better, and start critical analysis of the discussed material sooner. Students often find themselves frustrated with the volume of terminology associated with every new topic and challenged to appreciate the precise meaning of each term when studying in fast-forward mode. To motivate students to dedicate time and effort mastering biology vocabulary, I have designed a vocabulary exercise utilizing the popular web encyclopedia Wikipedia (www.wikipedia.org). The exercise creates an opportunity for students to connect the challenge of vocabulary learning to a prior positive experience of self-guided learning using a content source they are familiar and comfortable with.

The developed tool takes advantage of the interactive mode of content presentation in Wikipedia which allows the reader to choose how much information to review by opening (or not opening) weblinks embedded in the text. Students are prompted to model studying for exam with and without operational vocabulary knowledge, and thus are given the opportunity to realize that vocabulary fluency could significantly increase the efficiency of their learning.

The exercise is appropriate for courses in any biological sub-discipline designed for majors or nonmajors. The tool could be easily incorporated as a part of discussion on class expectations or tips on how to succeed in the course. In addition, it can serve as a platform to introduce the focus of the discipline and discuss the reliability of various sources of scientific information. While the use of Wikipedia in undergraduate education is somewhat controversial, it is important to note that the course instructor chooses and proofreads the Wikipedia content to be included in the assignment, thus eliminating any concerns with respect to its validity.

PROCEDURE

The developed exercise (see Appendix I for an example handout) asks students to time themselves reading a paragraph of Wikipedia without and with opening weblinks, and record the following data points: Time for Reading (TR), and Time for Internet Reading (TIR). TR is defined as the time needed to read short text of Wikipedia origin pasted into the body of the assignment, whereas TIR is the time to read the same text online while opening all embedded links and reading one paragraph on each new screen. Once the data points are recorded, students are asked to calculate the ratio of TIR to TR. The reading without opening the weblinks (TR) is modeled as reading for exam without knowledge of the vocabulary, whereas the reading with opening of the weblinks (TIR) is modeled as reading for exam without knowledge of vocabulary. On average, the students report that it took them seven to nine times longer to read the text of the assignment without vocabulary knowledge, which directly and clearly demonstrates to them the importance of timely learning of biology terminology.

The specific numerical data were obtained with the assignment in Appendix I, including two paragraphs about the scope of Cell Biology with a total of 25 weblinks. The TIR to TR ratio and the time dedicated to the assignment can be varied by changing the length of the paragraph(s) included in the assignment or by changing the target for reading after opening each weblink. For example, if students are asked to read only one sentence instead of one paragraph, the TIR to TR ratio will be slightly different.

For maximum impact, the exercise can be executed as an in-class assignment completed individually (laptop or computer lab access are required) and followed by a class discussion. The discussion is most effective when students are asked to tabulate their data on the classroom board and to calculate averages for each data point (TR, TIR and TIR/TR ratio). The approach allows students to appreciate that everyone has had the same experience: “studying efficiently” when biology vocabulary is operational and “studying not that efficiently” when vocabulary knowledge is not solid. Alternatively, the exercise can be executed as a class assignment by asking students to volunteer reading
aloud and recording times of reading, followed up by a class discussion. Another possibility is to offer the exercise as homework. Both alternatives cut down somewhat on the usage of class time and circumvent the need of individual computer access; however, they offer less opportunity for highly involved classroom discussion based on multiple individual data entries.

The described tool can focus on any topic of interest. I usually offer the exercise as part of the first or second class of the semester, and choose a paragraph introducing the scope of the course/biological sub-discipline. The approach prompts students to explore the subject of the course on their own and allows me to guide the students towards indentifying connections to prior courses and knowledge. In addition, I use the vocabulary exercise as a primer for discussion on: “What are reliable sources of scientific information?”

**DISCUSSION**

The developed Wikipedia-based tool emphasizes the importance of timely learning of biology vocabulary in a fashion that students can easily relate to. In addition, it offers multiple possibilities to meet the challenges of first day of class such as introducing the scope of the discipline, reviewing reliable content sources, and connecting course material to prior knowledge and courses.

The success of the tool depends largely on the comfort of students using Wikipedia. A recent study conducted by The Pew Internet & American Life Project found that 52% of interviewed individuals with some college experience (i.e., most likely current undergraduates) have used Wikipedia at the time of the survey in 2010, up 6% from the same data for 2007 (3). Assuming the trend continues, soon most of our students will be Wikipedia users driven by the convenience of the web-based encyclopedia and its connectivity to search engines (3). Chances are that in the era of electronic gadgets, students are much more likely to relate to a web-based tool than to the pages of a textbook glossary section.

How reliable is the information on Wikipedia? A study conducted in 2005 concluded that Wikipedia reliability is similar to the one of the web versions of classical encyclopedias (1). In the context of the assignment, the reliability of the information is not an issue since the Wikipedia content is chosen by the instructor. Extending the assignment into a discussion of appropriate content sources creates an opportunity for careful analysis of the advantages and disadvantages of Wikipedia as such.

**CONCLUSION**

The developed tool prompts students to take responsibility for mastering biology vocabulary and using it to acquire and communicate knowledge. Motivation to study and master biology vocabulary is a key for efficient learning. After all, as biology expands and continues to specialize, the volume of the specific terminology increases, and most likely so will the number of Wikipedia entries.

**SUPPLEMENTAL MATERIALS**

Appendix 1: Assignment Handout - Vocabulary Exercise

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**REFERENCES**