Learning can be all Fun and Games: Constructing and Utilizing a Biology Taboo Wiktionary to Enhance Student Learning in an Introductory Biology Course

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INTRODUCTION

Designed to establish and provide a strong conceptual foundation in the domain, most introductory courses in the biological sciences are inherently content-dense and rich with jargon—jargon that is often confusing and nonsensical to novice students. These characteristics present an additional paradox to instructors, who strive to achieve a balance between simply promoting passive, rote memorization of facts and engaging students in developing true, concrete understanding of the terminology. To address these concerns, we developed and implemented a Biology Taboo Wiktionary that provided students with an interactive opportunity to review and describe concepts they had encountered during their first semester of introductory biology. However, much like the traditional Taboo game, the rules were such that students could not use obvious terms to detail the main term. It was our belief that if the student could synthesize a thoughtful, scientific explanation of the term under these conditions, he or she demonstrated a true understanding of the conceptual context and meaning of the term. We furthermore asserted that students guessing the terms during game play demonstrated a similar level of understanding and retention. Course participants uploaded completed descriptions onto the Wiktionary site for use as a reference tool throughout the remainder of the semester.

PROCEDURE

Preparing the Game Setup

As referred to previously, the game of Taboo was adapted to meet the content and organization of an introductory biology course, Principles of Biology I, which typically enrolls approximately 300 majors and nonmajors students per semester. In Taboo (Hasbro Inc., Pawtucket, RI), one person is given a series of cards containing both a primary word or phrase (for example, ‘bicycle’) and three “taboo” words (for instance, ‘wheel’, ‘ride’, and ‘pedal’). The goal of the game is for the individual to have his or her partner guess as many primary words as possible in a given amount of time without using the “taboo” words to describe the main term. The team that identifies the most primary words correctly wins.

In Biology Taboo, students were provided with a set of 78 cards containing terms that had been discussed throughout the course. These terms included such concepts and processes as cellular respiration, glucose, photosynthesis, and acetyl-CoA, among others. Primary terms and “taboo” words were arranged on the game cards as described above. Game play proceeded as described below.

Running the Game

To formulate a series of playing groups, students were asked to sit according to their appropriate laboratory section (18–21 students per section). While we ran the game in lecture by having students sit according to their lab sections, it is easily adapted to run in an actual lab or discussion session. Each section was then given a full set of cards and asked to adhere to the following rules:

1. One student from each section stands in front of his/her section with the set of game cards and begins play.
2. The remaining students have one minute to guess as many terms as possible.
3. A graduate teaching assistant (GTA) or undergraduate learning assistant (ULA) stands by the student to ensure that he or she is not using the “taboo” words and to keep time.
4. While a student is describing words, he or she cannot immediately skip terms. If the student is having difficulty with a particular term, GTAs or ULAs may assist. Only after an allotted time (~ 10–15 seconds) may the student discard the term and proceed to the next.

Constructing the Wiktionary

Since our goal was not simply to provide a fun exercise for the students but also to help reinforce important biological concepts and terms, we wanted the students to use the game terms to set up a class ‘wiktionary’ - a wiki dictionary made up of all of the words from the Biology Taboo game. Each section received the same 78 terms; however, we starred six different terms in each section. After the designated amount of playing time (~ 25 minutes) had expired, the starred terms were distributed such that one term was...
allocated to a group of approximately three to four students so that all 78 terms were covered. The students were then asked to provide a definition of the starred term using the three “taboo” terms and not using their textbook or notes. One student in each group was then required to post the consensus definition on the course Wiktionary page, which was constructed using the Wiki tool function on the course’s ELMS Blackboard space (Fig. 1). Following upload, available consensus definitions could be further modified by any course member, as appropriate – for instance, in cases of grammatical or factual error.

CONCLUSION

The Biology Taboo Wiktionary was intended to provide an engaging and interactive interface for reinforcing fundamental biological terms and concepts. While we initially anticipated that the sheer size of the course would restrict the effectiveness of the activity, self-reported survey data indicated that > 70% of students enrolled in the course found the activity to be beneficial both in reinforcing course material and in preparing them for course assessments (such as the final exam) in a comprehensive manner. While the activity therefore appeared to accomplish our goals, and while we did notice that certain students were very enthusiastic, others were shy, anxiety-stricken, or appeared uninterested. To incorporate more students and ease anxiety in future iterations of this activity, we propose to place students in random groups of twenty or less based on where they are seated in the lecture hall, thereby increasing the likelihood that student groups will consist of peers who have already engaged in class activities together.

With specific regard to the game setup, we found that some cards were not as effective as expected because the audience was simply shouting many semi-related words without demonstrating a clear concept of what the primary word meant. While a consensus definition of the term was still ultimately derived in most instances, this behavior was often disruptive to other groups in the lecture hall and indicated to us that the terms were either too difficult or too easy for students to describe. These terms will be removed when constructing future card sets.

In addition to the caveats detailed above, we found two unexpected benefits to the wiktionary portion of the activity. First, we found that some of the students in the class took it upon themselves to go to terms that they were not responsible for and edit them for clarity. Second, we found that many students in the class used the wiktionary as a study tool, with some of the words showing over 100 hits by the time the final exam was administered (see Fig. 1).

While we employed this activity only in the context described above, the Biology Taboo Wiktionary has the advantage of being able to be run in either a large lecture class or a lab/discussion class with limited funds. Furthermore, the above observations lead us to believe that this tool is therefore adaptable to any content-rich, vocabulary-rich science class as a means to effectively engage students in course material and enhance student learning of key biological phenomena.