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Improving Learning Outcomes in Organic Chemistry at BGSU Using Chemwiki Technology

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Megan Mooney

Honor's Project Proposal

Project Proposal

I. Background

Today's classrooms and educators are using technology as an essential part of instruction and out-of-class learning. In efforts to keep up with the growing technological advantages, educators have been presented with new challenges to incorporate online and blended learning in and out of their classrooms (Gikandi, 2011). One such online learning tool that has been widely used and has captured the attention of several educators, including those at BGSU, is wiki technology. Increased use of online wiki pages within classroom settings has began its way into the classrooms of several BGSU courses, but not yet seen in the chemistry department where upper level courses, such as organic chemistry have a rigorous reputation. Given the demanding reputation of organic chemistry, incorporation of an online blended study tool and resource for students enrolled in CHEM 3410, such as a "chem" wiki page, would be beneficial to the learning outcomes, and psychological well being of students.

Wikipedia is an online work encyclopedia that allows its users to collaborate and edit web pages as a group without requiring users to be together in the same location (Wei 2005). Such technology provides the results of group work on one easily accessible wiki site and allows any user to edit and discuss web pages. The potential uses of wiki pages are endless and can range from note taking, portfolio display, small individual assignments, and even large-scale collaborative projects

(Ferris, 2006). Wiki pages are increasing in popularity in higher-education classrooms due to the relative ease in which students and professors can access and collaboratively edit the online web pages. Students have the ability to edit and post information, leave comments on previous posts and discuss the work and ideas of others on the wiki pages, which makes it a great resource for students for interact with others. Wiki pages can be designed by anyone and have acquired more usage in university chemistry departments across the United States in recent years. These specific wiki pages are called “chem” wikis and provide basic concepts and explanations in chemistry from its creators, and can be further subdivided into specific disciplines of chemistry. The development of a successful chem wiki page specific to organic chemistry is the goal of the honors project.

The careful design and planning behind the chemwiki page will ultimately aid in its overall success. Wiki pages are useful tools because they allow users to be in remote locations, where internet connection is possible, and collaborate with others on the wiki pages without actually being in the same environment (Wei, 2005). Wiki pages allow group projects to be more accessible to group members and more convenient for all students. Furthermore, the discussion and comment feature available on wiki pages allow to students to interact with one another and ask questions at their convenience or when questions arise, which in turn creates a higher level of critical thinking and assessment among students (Instructional Design and eTeaching Services). Wiki pages are also designed to be user friendly and individuals without a strong computer or web-based background can easily learn how to navigate and use the site (Wei, 2005). Easy usage and convenience

make wiki pages a great resource for students, but educators also benefit from wiki pages. With the use of wiki pages, educators can provide a different communicational tool for students to retrieve information and ask questions without the need to extend office hours or additional class time (Ferris, 2006). Through wiki pages, educators can set up online office hours where students are free to message the educator or teaching assistant for help. This is an extremely useful tool for not only teachers to extend personal help but an additional opportunity for students to receive help.

Although there have been numerous advantages to wiki pages in the classroom, there are also some pitfalls the web page has experienced. The most notable disadvantage of wiki pages is the question of validity within the pages due to wiki's easy editing feature (Ferris, 2006). Users and perhaps viewers become concerned with the integrity of the information they read from such pages, and the question of who is allowed to edit and create these pages are a concern amongst many. Also, wiki pages can also provide "battle grounds" for arguments that arise over content and quick editing to pages can make this aspect of wiki pages a large disadvantage (Ferris, 2006). Evaluating the advantages and disadvantages of wiki pages will aid in the development of a chem wiki at BGSU.

II. Project Overview

A. Objective

The specific goal of this honors project is to design a chem wiki page for to CHEM 3410 students at BGSU. The chem wiki page will provide a general outline of major topics discussed in organic chemistry, allowing the students to benefit from

collaborative work with peers and additional classroom resources. This will include but not be limited to mechanistic descriptions of reactions, explanations of theory, and a possible glossary of terms.

B. Design

Initially, the content for the chem wiki page must be outlined for the corresponding first semester CHEM 3410 course. The information will be collected by consulting several different textbooks and other chem wiki pages. The basic format of the wiki page outline will be that of a conceptual outline rather than corresponding with a particular book so that students can easily access the information regardless of the textbook being used. The general outline of the content will include: electronic structures, nomenclature, stereochemistry, reactions, ect.

C. Implementation

The wiki page will be developed through the BGSU.WIKISPACES.NET, which will only allow BGSU students to use the pages and edit the pages. Therefore, eliminating the issue of people edit pages that are not BGSU chemistry students. The webmaster of the page will be Dr. Klosterman because the purpose of this project is to extend long term to that several classes of students can use and benefit from the chem wiki page.

D. Future Use

The scope of the project will be designed for its continued use for students in subsequent years. The web page will eventually contain information from a full year of organic chemistry spanning from CHEM 3410 and CHEM 3440 courses. The chem

wiki page provides a platform of potential uses that include: group projects, individual assignments, and extra credit opportunities.

E. Considerations

Amongst designing this project there are several details to consider. First, it is important to consider the layout and design of the wiki page to allow easy access for students to read and edit information. Students must also be able to freely edit and author pages to encourage critical thinking and research skills. By designing a page that is compatible for student usages, the chem wiki page will be incorporated into the course curriculum and students will be expected to use and author the page.

III. Conclusion

In conclusion, a chem wiki page for BGSU organic chemistry students is the ultimate goal of the Honors 4890 project. Development of this page will take several design "trial and errors" to create a useful and successful page. Also, the controls of editing and user access will be further investigated in order to provide credible information while allowing students to freely edit information and feel engaged. With further meetings with organic chemistry staff, a chem wiki page will be created and used during the fall 2012 CHEM 3410 course and its degree of success will be evaluated by the students who will enrolled in the course.

Annotated Bibliography

Elliott, E. and Fraiman, A. "Using Chem-Wiki To Increase Student Collaboration through Online Lab Reports." *Journal of Chemical Education*. 87.1 (2009): 54-56. Print.

The use of wiki in the classroom and specifically in chemistry laboratories at Northeastern Illinois University has proved to be successful. Organic chemistry students at the University of Northeastern university has used wiki technology to collaborate and display findings during the laboratory portion of the course. Students are assigned to post their lab reports on the chem wiki page and other students are then free to comment on the results and discuss the lab outside of class. This project was specifically designed to enhance and facilitate the collaboration and exchanging of ideas between students outside of the designated lab time.

Ferris, S. and Wilde, H. "Uses and Potential of Wikis in the Classroom." *Innovate*. (2006): n. pag. Web. 28 Feb. 2012

As technology continues to change and alter our lives, educators have also been forced to alter teaching methods. Electronic and online learning have become a large part of classroom assignments in higher education and among some of the resources that have been used, wiki pages are among some of the most used resources. The uses of wikis have ranged from purely informational resources create by the professor to large-scale projects assigned to students. There have been several debates focused around the use and accuracy of wiki pages and how students and users can benefit from wiki pages. The ease of editing wiki pages can facilitate student collaboration, yet can create discrepancy in information and is amongst the greatest concerns with the use of wiki pages in the classroom.

Gikandi, J.W. et al. "Online Formative Assessment In Higher Education: A Review of Literature." *Computers and Education*. 57 (2011): 2333-2351. Print.

As online and blended learning has become more common in educational settings, educators are being faced with the challenge of incorporating online assignments and learning into their curriculum. How online assignments and learning are being presented in classrooms largely contributes to effective learning students acquire through assignments. This article provides a review literature analyzing and identifying the methods and format qualities of online learning that provides the best overall results from online learning. Also, potential benefits of online learning assignments are discussed as well as how online and blended learning foster interactive learning experience.

Hicklin, Andrea. "UC Berkeley Students Help Improve Wikipedia's Credibility." *UC Berkeley News Center*. 5 Nov. 2010. Web. 28 Feb. 2012.

Professor Brain Carver the University of Berkeley California has been using wiki pages as course assignments in order to improve student interactions and engagement in his course. Carver has successfully used wiki pages and assignments in his classroom for 5 semesters and the student feed back has been overwhelmingly positive. UC Berkley is one of 10 collaborating public universities that is involved in the WikiProject Public Policy Initiative, which is a program aimed to improve the quality and content of wiki pages by having students and professors control and update content as a requirement for the course. Overall, the program has had increasing success and has been extremely successful at UC Berkley.

Instructional Design and eTeaching Services. Boston College. 3 Mar. 2011. Web. 27 Feb 2012.

Using wikis in the classroom gives students the opportunity to author and edit within a collaborative environment. Allowing students to collaborate and edit information on there own, authors gain several benefits. Such benefits can include the enhance interactions between students, which allows them to learn from one another. Also, a large benefit from the wiki pages in classrooms is that students further develop critical thinking skills and investigative skills that can allow the students to understand and research material at a deeper cognitive level.

"My Brilliant Failure: Wikis in Classrooms." *Kairosnews*. A Weblog for Discussing Rhetoric, Technology and Pedagogy, 21 May 2004.

Despite having overall success with wiki pages in many classrooms and university courses, not all wiki pages have been successfully created and used. Amongst some of the failures was a visual design in web development professor from Ireland noted that her wiki page usage in the classroom was unsuccessful. The author noted that there could have been several reasons fro such failure with the technology and the upmost being control of the wiki page. Wiki pages were designed so that any user could potentially become and editor to that page and contribute to the information. Yet, as the author of this article wrote, when too much control is given over the content, students are less likely to participate in the editing and thereby learning process. Therefore, it is important that when using wiki pages in a classroom setting, that the students are easily able to contribute to the pages and edit information as means of a learning experience.

Schulenburg, Frank, et al. "Lessons from the Classroom: Successful Techniques for Teaching Wikis Using Wikipedia." *WikiSym*. (2011): 231-232. Print.

The Public Policy Initiative was established by the Wikimedia Foundation as an effort to improve the content of wiki pages by increasing the number of users and editors that are in university classrooms. As a part of this initiative, professors have been made aware of the potential benefits of using wikis in the classroom and how it can facilitate a better understanding in the course. There are several objectives noted for this project and amongst them are critical thinking, collaboration, writing skills, media literacy, and literature review. Also, it is important that students have an online mentor to aid in the navigation of wiki pages. Professors are advised to select notable articles, topics, and ideas that were obtainable to students and that can be done in a timely manner.

Wei, Carolyn, et al. "Wikis for Supporting Distributed Collaborative Writing." *Society for Technical Communication*. (2005): 204-209. Print.

Wikis have become an excellent online tool and resource for educators and a collaborative tool for students. Shared online group work and editing is a useful tool for students. In order for students and educators to use wiki pages with ease and comfort, there are several navigational menus and tools that are important to recognize. The organization of content within a wiki page is essential to the success to wiki pages and how well students to able to edit and collaborate online. Although wiki pages have been designed for easy use, it is the structure of the content that allows for successful benefit.