

# Fall 2020 OER Implementation Grant Report

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The open educational resource that I used for the Fall 2020 semester was the book entitled *The Art of Writing Reasonable Organic Reaction Mechanisms, 3rd Edition* by Robert Grossman. I implemented this in my CHEM 330: Organic Chemistry III course, which had an enrollment of twelve students, all of whom were juniors or seniors. This textbook has a level of sophistication appropriate for students who have already taken two semesters of organic chemistry, and it is organized so as to classify reactions by their mechanisms, rather than by the transformations they achieve. The main goal of the text is to train students to think logically and analytically about organic reaction mechanisms. The material covered, moreover, reflects the diversity of reactions in modern organic synthesis. As such, this book aligns well with the major aims of this course: preparing students for graduate coursework in organic chemistry, and introducing advanced concepts students would expect to see upon entering chemical industry. This book is considered a *must-have* by many chemical researchers both in academia and industry.

### *How I Perceived Students Engaging with the OER Materials:*

On June 2, 2020, I emailed students enrolled in the course to make them aware that the only text required for this course was available as a free e-text from The Weinberg Memorial Library (PDF or ePUB formats). I provided them with the link, and let them know that I was interested in getting away from \$300 textbooks. Once the D2L site was available, I posted the link again along with the syllabus and other materials. After the semester ended, a survey of the students showed that 10/12 preferred the use of the OER textbook, and felt that this practice should be expanded to other courses. The comments from the students, moreover, were very helpful. The two students who did not prefer the OER text both bought their own physical copies. They reported enjoying the tactile interactions with a physical copy, and felt that having the book as a quick-reference as they moved forward in their studies would be helpful. One student noted that “staring at the screen for too long makes me tired.” In fact, many students, both on the survey and throughout the semester, reported screen-fatigue. (This course was offered using a rotational model of the Royal Flex Plan.) Half of the students noted preferring paper materials, but the zero-cost of the OER text weighed heavily in their decision to use it.

Another aspect of the OER material all students found helpful was the online answer key provided free of charge on the author’s website. The key to success in organic chemistry for many students is to continually test their comprehension on practice questions. For many texts, the answers to the practice questions embedded in the textbook are either behind an online paywall, or in another book altogether (one that is often almost as expensive as the original text!) All of the practice questions in this text are drawn from the chemical literature, and the author has provided pages of his solutions for free. Students were also very complimentary regarding the ease of use of the Weinberg Memorial Library’s website. No students had difficulty accessing the textbook. Being available both in ePub and PDF format, the students preferred the PDF format, especially because it made searching by keyword very easy.

### *Future OER Plans:*

I will continue to use OER material for the CHEM 330 course. I will also use OER material for the the upper-division courses I teach (CHEM 330L, CHEM 391, CHEM 440L, CHEM 493/494). CHEM 232/233, however, is where students (mostly sophomores) first study organic chemistry, and for many students the course sequence comes with much apprehension. The text we currently use is *Organic Chemistry, 3rd Edition* by David Klein (\$125 for loose leaf!!! The Student Study Guide and Solutions Manual is an additional \$116, again for loose leaf). I would love to replace this very expensive textbook with OER material. This book, however, is considered by many to be the best textbook for introductory organic chemistry. Having used many books in my career, I can attest to how well-written and organized

this book is. In fact, one of my CHEM 330 students wrote on the survey that it was “one of the best textbooks I have ever read.” Three student survey responses in particular cautioned against replacing this text with OER material. I, moreover, have not yet found any OER material that would dissuade me from keeping the Klein textbook. I feel that current OER offerings would not provide the educational foundations in organic chemistry that Klein’s book does. Were I able to discover high-quality, refined, OER material for organic I and II that was comparable to Klein’s text, I would happily switch. I am always on the look-out for such opportunities.

***Additional OER Discovered:***

With CHEM 330 being an advanced course for majors and other interested students, I took advantage of the University’s subscription to the American Chemical Society’s journals, particularly *The Journal of Organic Chemistry* and *Organic Letters*. Not only did I draw examples from the current literature for use in class and on examinations, I instructed students to browse the journals in search of examples of reactions we discussed during class periods. Students were able to easily access the content, and they provided short descriptions of some of the chemistry they discovered in this process for graded assignments. As these students advance in their careers, they will start contributing to the chemical literature, and familiarization with this material now will be beneficial.

***General Feedback Regarding OER and Implementation:***

Students overall were receptive to this high-quality open-access material. While students do seem to prefer physical texts, especially after many months of online instruction, the zero-cost of the text-book was a major driver for its adoption by a majority of the students. I will continue to use this text, and to look for other opportunities in my sophomore-level courses.