

The University of San Francisco

USF Scholarship: a digital repository @ Gleeson Library | Geschke Center

USF OER Faculty Grant

Gleeson Library | Geschke Center

8-13-2019

OER for Math 102 Biostatistics

Olivia Mah

Follow this and additional works at: https://repository.usfca.edu/library_oer

Report on Gleeson Library Open Education Fund – Written by Olivia Mah (August 13, 2019)

This report consists of six sections:

- I. Implementation period of the grant
- II. Summary of results
- III. Difficulties encountered
- IV. Looking to the future
- V. Attachments
- V. Three tables (A, B, C)

Here are the sections:

I. Implementation period of the fund

The project was implemented in the classroom in **Spring 2019** as originally scheduled in the proposal (one section of Math 102 Biostatistics). Follow-up activities were carried out in August 2019. In addition, the OER materials produced in Spring 2019 will continue to be used in Fall 2019 (two sections of Math 102 Biostatistics) and thereafter. This report was written in August 2019.

II. Summary of results

There were two major proposed ideas in the grant proposal:

- 1) Put together OER materials for **learning R with biological data** so as to save students from buying an *additional* textbook on R (because the existing textbook does not have an R component)
- 2) Put together OER materials for **learning statistics with biological examples and biological data for homework** so as to replace the *existing* textbook.

With the fund, I was able to do the following:

- 1) I put together and implemented a set of self-contained OER materials for **learning R with biological data in Math 102 (Spring 2019)**. As a result, I do not need to assign an *additional* textbook for this coming semester (Fall 2019) which typically costs between **\$60 to \$90**. Without the OER materials on which I received good feedback from students in Spring 2019, I would need to assign an *additional* textbook (for the R component) similar to the following:

- Biostatistics and Computer-based Analysis of Health Data using R (Hardcover \$91)
- Getting started with R: an introduction for biologists (Hardcover \$70)
- Biostatistics with R (e-book \$64.99)

Also, by having custom-tailored OER learning materials on R for the biology students, students learned exactly what they needed without feeling overwhelmed by irrelevant materials. In addition, since I wrote most of the materials myself (supplemented by existing OER materials found on the internet), I made sure that the materials were consistent in look-and-feel. Therefore students were not distracted by inconsistent versions / presentations / formats from various sources. In short, the OER materials for learning R with biological data has helped to deliver a high **quality of learning** experience for the students (see attached survey_results.pdf). In addition, the 5 R's of OER learning have been achieved. See Table A.

- 2) While I ran out of time to fully replace our current textbook this coming Fall semester of 2019 (the Honorarium for faculty pay was 0.4 unit), I was able to compile a list of resources, in particular with respect to free biological data for doing R homework. Therefore in the near future if I choose to write an OER textbook on biostatistics (as there is no suitable OER book on biostatistics, the R lessons that I have produced and the free biological data that I have identified would come in handy. Consequently, the potential benefit for students is that the resources that I have produced and compiled this semester have reduced my dependency on the current textbook and increased the likelihood to replace the textbook entirely in the future. (See the section **Difficulties encountered** below for more details).

III. Difficulties encountered

i) Lack of off-the-shelf OER biostatistics books with good and free biological datasets

The most important factor in replacing the current textbook (**statistics and biological data** for homework) and eliminating the need to buy an additional textbook on learning **R** (with **biological data**) is to come up with **good quality and not-too-outdated biological data for examples and homework purposes**. At the time of writing the proposal¹, I expected that there would be “off-the-shelf” OER materials on biostatistics or at least I would be able to find good and free

¹ I was invited to apply for the grant on Dec 11, 2018 and the grant proposal was due on Jan 4, 2019. Due to the final exam grading and the holidays, I did not have a lot of time to do web search for the grant before the due date to realize the scarcity of OER materials on biostatistics with good data.

biological data on the internet. Unfortunately, after intensive search of the internet for hours at a time for many weeks, I realized the following:

- There does not appear to be an OER biostatistics book available.
- There are OER statistics textbooks but they do not have biology examples or biology datasets.
- There are OER materials on learning R but they do not have biology datasets.
- There are a couple of websites offering biology datasets but the data are old (e.g. from 1960's), without good descriptions or too large and complicated for homework use.

In short, looking for good quality and free biological data took up a lot of my time.

While I managed to find enough biological datasets (rather old data) to illustrate R techniques after intensive search, I was not able to find enough biological datasets to illustrate all statistical principles and assign corresponding homework problems. Also, since I was not able to find an “off-the-shelf” OER book on biostatistics, to replace the current textbook would imply that I write an entire OER textbook on biostatistics from scratch. Realistically, there was just not enough time within one single semester to do that, especially when I also had to work on the OER materials for learning R with biological data.

ii). Lack of up-to-date R materials

In addition, finding OER materials for learning R was also more time-consuming than I expected because many OER materials on the internet use earlier versions of R and RStudio (graphical interface for accessing R). Since the time spent on looking for up-to-date materials would take much longer than simply writing the materials from scratch, I decided to write most of my own R materials supplemented by additional resources from the web. This method worked quite well and saved me a lot of time at the end.

IV. Looking to the future

After the spring semester was over, I searched all the biostatistics textbooks that I could find on the web (via Google books) to look for good biological data. I was hoping to find free downloadable biological data even though the books themselves may not be free. After searching through nearly two dozens biostatistics book one-by-one, I have identified several websites from the authors or publishers which offer free biological data for download (but the books themselves are not free). Being able to locate these datasets greatly reduces my

dependency on the current textbook and puts me a step closer to writing an OER biostatistics textbook if I choose to do so in the future.

V. Attachments

- survey_results.pdf
 - There are altogether seven questions in the survey. The pdf consists of screenshots showing students responses to each question (SurveyMonkey does not allow free printing of survey results in pdf or any other format).

- R_lessons_screenshots.pdf
 - The first page shows one of the lesson layouts in Spring 2019 on Canvas
 - The second page shows all the lessons on Course.cafe which is where students of Fall 2019 will access.
 - The third page shows one of the lesson layouts on Course.cafe.

VI. Three Tables

The following three tables (A, B, and C) in this section detail the **Outcomes** and **Benefits to Students** in response to what was written in the proposal. Some of the details have already been covered in the section **Summary of results** above.

Table A

Objectives in Proposal (copied from the proposal)	Outcomes	Benefits to Students
<p>How to use the fund:</p> <p>Traditionally, students in Biostatistics would need two textbooks—one for statistical concepts, and another for learning the software R. Since the semester has already started, students have already bought their statistics textbook. However, the textbook does not have the R component. Therefore if I can put together OER materials this semester, I can save students from buying another R textbook and also simplify the learning materials and improve their learning experience in this semester. More importantly, I can save students from buying BOTH textbooks next time I teach it.</p>	<p>Summary</p> <ul style="list-style-type: none"> I put together OER materials on learning R with biological data on both Canvas and an off-campus website called Corsebook.com by remixing various materials such as videos, online book and pdfs, etc. After the semester is over, based on students' preference with the presentations in Corsbook.com over Canvas, I moved all the R lessons on Canvas over to Corsbook.com (the site has been renamed to Course.cafe). <p>https://www.course.cafe/math/course/biostatistics/</p>	<p>Monetary:</p> <ul style="list-style-type: none"> This saves each student about \$60 - \$90 from buying an additional textbook of biostatistics in R <p>Learning:</p> <ul style="list-style-type: none"> Since the OER materials were custom-made for this class, students learned exactly what they needed instead of feeling overwhelmed and confused with irrelevant materials. Students can retain copies of the lessons by printing pdfs for free (whereas printing pdfs are typically not allowed for digital ebooks from publishers or only for limited quantity) Based on students' ongoing feedback throughout the semester, I was able to revise the contents

Objectives in Proposal (copied from the proposal)	Outcomes	Benefits to Students
	<ul style="list-style-type: none"> While I am not completely able to replace our current textbook at this stage, I was able to produce my own set of self-contained OER materials on R with biological data and identify a list of free biological data sets for future use as mentioned above. 	<p>quickly and increase the effectiveness of student learning.</p> <ul style="list-style-type: none"> I can reuse the R lessons in every semester from now on and not have to worry about upgrading textbook editions. <p>Potential benefit in the future</p> <ul style="list-style-type: none"> By having biological data sets from a source different than that provided by the current publisher, I have gradually reduced the need to depend on the current textbook and this will make it a lot easier down the road if I choose to write an OER biostatistics textbook from scratch.

Table B

Tasks in Proposal (copied from proposal)	Outcomes	Benefits to Students
<p>1) Identify OER course materials that combine the following:</p> <ul style="list-style-type: none"> the statistical concepts the instructions for using R homework assignments in using R examples in biological and life sciences <p>The course contents will be a combination of the following</p> <ul style="list-style-type: none"> OER materials already available on the internet Chapters from online books available in USF library Gap-filler and framing materials written by the instructor (Olivia Mah) 	<p>I remixed various resources to create learning lessons in R with biological data:</p> <ol style="list-style-type: none"> free videos on learning R from USF's site Lynda.com free pdfs on learning R from internet free online (HTML) on learning R free YouTube videos on learning R free biological data (a bit old) from the internet created my own short videos on learning R wrote materials on learning R <p>See R_lessons_screenshots.pdf for the layout of a couple of lessons on Canvas and Course.cafe.</p>	<ul style="list-style-type: none"> In addition to saving student money from buying an additional textbook, students liked the Corsbook platform based on the survey they completed at the end of the semester. See survey_results.pdf
<p>2) Use the OER materials in my teaching this semester and collect feedback from students regarding their learning experience in using the OER materials.</p>	<ul style="list-style-type: none"> I put the OER materials for learning R on two different platforms: Canvas and Corsbook.com. Students accessed these websites weekly to learn R and do their R homework. 	<ul style="list-style-type: none"> Overall, students had a good experience with the OER materials. See attached survey_results.pdf

Tasks in Proposal (copied from proposal)	Outcomes	Benefits to Students
	<ul style="list-style-type: none"> I created a survey on SurveyMonkey to collect feedback. 18 out of 22 students responded to the survey. See attached survey_results.pdf 	
<p>3) Compare the following free authoring tools which I plan to use:</p> <ul style="list-style-type: none"> Canvas (already paid by university) Corsbook (free) 	<ul style="list-style-type: none"> See attached survey_results.pdf 	<ul style="list-style-type: none"> According to feedback from students, contents on Corsbook.com were easier to read. Also, some students preferred to have R lessons on a non-Canvas site because they found it easier to navigate homework and learning materials if they could open separate windows—homework (on Canvas) and R instructions (on corsbook.com). See attached survey_results.pdf

Table C

Other tasks planned in proposal (copied from proposal)	Outcomes	Benefits to Students
<p>What resources/help do you need from Gleeson, ITS, ETS, CTE, and the bookstore in order to accomplish your goals? (250 words max)</p> <ul style="list-style-type: none"> Find out from ETS if pdfs can be generated from Canvas (I was told that the feature to generate pdfs was in beta version) Find out from Gleeson how to incorporate chapters from online textbooks 	<ul style="list-style-type: none"> Emailed the ITS staff about generating pdfs from Canvas. Then I generated pdfs (epub) from Canvas and realized that I could not generate pdfs just for the R lessons (It appears that in Canvas, one has to generate one single for the entire course content). Since I did not find any standalone chapters from textbooks in the library suitable for my teaching purpose, I did not contact the library regarding how to incorporate chapters from online textbooks. 	<ul style="list-style-type: none"> Comparing the pdfs generated from Canvas and those from Corsbook, pdfs from Corsbook are much easier to read. Therefore towards the later part of the semester, I decided to use Corsbook as much as possible for R lessons. In August, I copied all R lessons from Canvas to Corsbook.com to make it easier for students to read the pdfs. (The website has changed its name to Course.cafe.)
<p>How do you plan to assess the success of your proposal? (250 words max)</p> <ul style="list-style-type: none"> Collect student feedback by the end of Spring 2019 on their experience in using the OER materials. The success of my proposal is also measured by having a mash-up of OER materials for Math 102 so that the materials can be used 	<ul style="list-style-type: none"> I created a survey on SurveyMonkey to collect feedback. 18 out of 22 students responded to the survey. See the attached survey_results.pdf. I have redistributed my R lessons with another instructor, who will be teaching in Fall 2019, by sharing the link to the Course.cafe website. 	<ul style="list-style-type: none"> The other instructor can see easily how I have structured my R content on Course.cafe. This facilitates exchange of ideas between me and any instructors who will be teaching this course in the future. (On Canvas, it is not possible to add an instructor as an observer after the semester is over).

Other tasks planned in proposal (copied from proposal)	Outcomes	Benefits to Students
the next time I teach or passed on to another instructor for this course.		

- END -

