



Philadelphia,

August 30th, 2019

RE: Drexel Libraries Faculty Fellowship 2019

I would like to submit this letter as a final deliverable to my 2019 Drexel Libraries Fellowship. The particular focus of this Fellowship was on adopting an open textbook in a particular class that I developed and taught for the first time at Drexel. Specifically, I used the fellowship to assist in drafting and delivering a new freshman course within the College of Engineering (COE) that was offered this Spring 2019 quarter. This course was offered this year as a pilot to a select group of 48 freshman students coming from all departments of COE in addition the School of Biomedical Engineering with the expectation that, if successful, this course could be offered in the following years to the entire freshman class in COE which includes approximately 700 students.

There were three expected deliverable by June 30th, 2019 that included:

- i) To engage two graduate students to complete course design
- ii) To design and adapt test measures to assess the impact of use of open textbook and licensed resources on teaching practices and learning outcomes
- iii) To prepare and deliver a presentation about open educational materials for interested faculty.

Below, more details for these deliverables are provided in addition to comments on the impact they had and lessons learned.

[1] Course design and Student Engagement

For my specific project, I worked with two of my PhD students to design the course: “*ENGR 113: Introduction to Digital Design & Advanced Manufacturing*” which was offered as one out of several sections in the Spring term and as part of the Freshman Design course sequence that is offered annually to all COE and BioMed freshman. There were two main reasons for which I chose a freshman required course in this Fellowship program. First, because it is important to create early good learning habits. Second, because the module I developed and taught relates to a highly interdisciplinary field for which a single textbook simply does not exist since concepts from many disciplines have to be selected and delivered in the classroom for students to acquire the needed knowledge and learn tools that ultimately assist in being successful in this course. Hence, it made absolute sense to me and my two PhD students involved to attempt to create a course curriculum that utilizes both open educational resources and materials licensed by the Drexel Libraries.

The reason that this course is appropriate for this Drexel Libraries focus area is because while “*Digital Design*” is a well-developed academic subject which has resulted in a plethora of resources revolving around the concepts of CAD (Computer Aided Design), CAE (Computer Aided Engineering) and CAM (Computer Aided Manufacturing), it is not well suited to be taught in conjunction with principles of “*Advanced Manufacturing*”,

which has recently revolutionized industrial level thinking in this topic (think of 3D printing). Hence, to teach such new course a combination of resources that span a broad range of science, technology and engineering topics needs to be crafted which currently does not exist in any textbook. More specifically, the course consisted of a weekly 2-hour lecture followed by a weekly 2-hour laboratory session which were purposely placed at different days of the week to allow content absorption and preparation before each class or lab session. For each lecture, the PhD students and myself provided the lecture notes in addition to a list of recommended reading material in the form of links found using the Drexel Library textbook and other databases as well as other online resources. Such reading material was further supplemented by online tutorials, videos, files and articles that related to each week's content.

I strongly believe that this project helped both the students and me as an instructor. For the students, it showed them how modern databases and online resources offer a wealth of information that goes above and beyond what could be found in a traditional textbook, printed or e-book. In addition, allowed them to customize their learning experience since a key component of the course is project-based. Students were exposed to some carefully selected core instructional material, and they also had to do their own research and understand how to find information through the Libraries and elsewhere. As part of the course, they needed to write a project proposal, utilize available bibliographical information in their design, benchmark their numerical and physical testing based on manuals and standards, and finally produce a final technical report that encompasses all of the above in a way that is easily communicated to a broader audience. For instructors, this more open approach to information gathering and distribution allowed me to incorporate parts of my own research into the curriculum, and also engage with them in research. In fact several of the students that I had in this class they were also STAR scholars in my research group this summer term while three of them also committed to continue research in my group in their Sophomore year.

Regarding the impact that this project had, I could say that the future of higher education depends on universities' ability to remain relevant in their mission to provide advanced knowledge and training as they continuously need to transform along with trends in technology, society and employment. In this context, the content that was taught based on open educational resources offered the opportunity to create customized experiences tailored to individual learning characteristics and needs. In addition, open textbooks go beyond the practical benefit of cost reductions often discussed as an incentive to give up traditional paper textbooks in favor of digital resources—they offer a dynamic way to modernize the way students get access to information, potentially making the student an equal partner in such knowledge transfer and creation.

[2] Design and adapt test measures to assess the impact of use of open textbook and licensed resources on teaching practices and learning outcomes

A number of measures were adopted to assess the impact this effort had on teaching practices and learning outcomes. First, several assessments were made during the term with questions related to the use of course resources. Second, a proposal, a blog and a quad chart were requested as ways to frame each of the projects conceived by teams of three in this class which all made use of the reading material provided via open textbook. Finally, the final presentations and reports made use of references, patents and cited online content in an appropriate and scholarly way which demonstrates that the attempted design of a curriculum using only open textbook resources was successful.

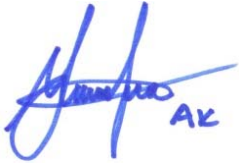
[3] Prepare and deliver a presentation about open educational materials for interested faculty

A roundtable discussion with the Dean of Libraries took place in June 2019 in which insights and lessons learned were discussed. Given the feedback received in that meeting and the experience gained in this Fellowship I

would be glad to develop and deliver a presentation to other interested faculty on the use of open educational materials.

Please contact me directly should have any questions or if you would need any additional information related to this report.

Sincerely,



Antonios Kotsos