

A Study of STEM Usage and Perceptions of OER at a Large Research University

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ABSTRACT

Academic librarians have a unique opportunity to build high-impact collections to support an institution's curriculum and research with the broad spectrum of OER and to be in a position to offer guidance on its availability, accessibility, and usability. To build a sustainable OER collection in any medium for STEM disciplines, librarians must first identify user needs in supporting curriculum and research through various collection management practices. For example, an assessment to demonstrate such needs can be conducted where students and faculty provide both qualitative and quantitative responses, which can guide the creation of an OER collection where user needs are considered using a *just-in-time* approach. This paper attempts to look at the awareness, acceptance, and use of OER on the University of Florida campus among STEM patrons and how libraries can facilitate to build and promote OERs. We conducted a usage and perception survey among the STEM faculty, researchers, and students for research and teaching. The results of the survey revealed that faculty and students acknowledge the importance of OER in both research/scholarly activities and instruction, but there is a big part of the faculty and student community that is unaware of OER content and its access. The majority of respondents do not know that the libraries offer OER collections through the UF library catalog. We suggested some strategies libraries can consider to support and promote the use of OER in the classroom and research and make it more easily accessible through various facets.



Image: Courtesy of Jared Craig

Keywords: Open educational resources (OER), perception, teaching, research

Un estudio del uso de CTIM y las percepciones de los REA en una gran universidad de investigación

RESUMEN

Los bibliotecarios académicos tienen una oportunidad única de crear colecciones de alto impacto para respaldar el plan de estudios y la investigación de una institución con el amplio espectro de REA y estar en condiciones de ofrecer orientación sobre su disponibilidad, accesibilidad y usabilidad. Para construir una colección de REA sostenible en cualquier medio para las disciplinas CTIM, los bibliotecarios primero deben identificar las necesidades de los usuarios para respaldar el plan de estudios y la investigación a través de diversas prácticas de gestión de colecciones. Por ejemplo, se puede realizar una evaluación para demostrar tales necesidades donde los estudiantes y el profesorado brinden respuestas tanto cualitativas como cuantitativas, que pueden guiar la creación de una colección de REA donde las necesidades de los usuarios se consideran utilizando un enfoque justo a tiempo. Este documento intenta analizar el conocimiento, la aceptación y el uso de REA en el campus de la Universidad de Florida entre los usuarios de CTIM y cómo las bibliotecas pueden facilitar la creación y promoción de REA. Realizamos una encuesta de uso y percepción entre los profesores, investigadores y estudiantes de CTIM para la investigación y la docencia. Los resultados de la encuesta revelaron que los profesores y los estudiantes reconocen la importancia de los REA tanto en la investigación / actividades académicas como en la instrucción, pero hay una gran parte de la comunidad de profesores y estudiantes que desconoce el contenido de los REA y su acceso. La mayoría de los encuestados desconoce que las bibliotecas ofrecen colecciones de REA a través del catálogo de la biblioteca de la UF. Sugerimos algunas estrategias que las bibliotecas pueden considerar para apoyar y promover el uso de REA en el aula y la investigación y hacerlo más fácilmente accesible a través de varias facetas.

Palabras clave: Recursos educativos abiertos (REA), percepción, docencia, investigación

一所大型研究型大学中STEM学科的OER使用和感知研究

摘要

借助广泛的开放教育资源（OER），学术图书馆员有独特机会创建具有高影响力的馆藏，以及支持机构课程和研究，并能够指导OER的可用性、可获取性和使用性。为建立一个用于STEM学科的可持续OER馆藏（不限形式），图书馆员必须在通过不同馆藏管理实践支持课程和研究的过程中首先识别用户需求。比如，在学生和教师提供定性和定量反馈的情况下实施评估方法证明这类需求，这能指导建立一个以“及时”（*just-in-time*）方法考虑用户需求的OER馆藏。本文试图研究佛罗里达大学校园中STEM支持者在OER方面的意识、接受度和使用，以及图书馆如何能促进建立并推广OERs。我们对STEM教师、研究者和学生进行了一项有关OER使用及感知的调查。调查结果显示，教师和学生承认OER在研究/学术活动及教学中的重要性，但很大一部分教师和学生不了解OER内容及其获取。大多数调查对象不知道佛罗里达大学的馆藏目录会提供OER馆藏。我们为图书馆提出相关策略，以期支持和推广OER在课堂和研究中的使用，并通过多种方法提高OER的可获取性。

关键词：开放教育资源（OER），感知，教学，研究



Fig. 1: Types of Open Educational Resources

Introduction

The recent COVID-19 pandemic presented an urgent need for access to openly available educational resources; higher education administrators, libraries, and faculty need to engage in a serious conversation about freely available educational resources. At the institutional level, administrators are seeking solutions to reduce the high cost of textbooks and journal subscriptions to alleviate the financial restraint triggered by the pandemic. One idea is to use various open educational resources to replace tradi-

tional textbooks used in the curriculum and open access journals. It is important to take a step back and define OER in order to avoid ambiguity. One of the best and most broad definitions comes from The Hewlett Foundation: "*OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. OER include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge*" (The Hewlett Foundation, 2016).

By adopting this broad OER definition, libraries and institutions can form new partnerships to reduce textbook and research material cost where applicable, collaborate on identifying the best choices for curriculum/research support based on the content and integrity of the source materials, accessibility, and the reduction of the amount of educational materials paid for by the students (i.e. textbooks), libraries (i.e. purchases for course reserves/journal subscriptions), and institutions (i.e. reduction of fees for students).

Yet, a challenge facing academic librarians is the need to navigate the conversation at institutional administrative levels since many of these OER decisions are made in collaboration with online learning units, campus bookstores, etc. Among several success cases, the University of South Florida Libraries case is unique; it demonstrates a growing partnership with its institution by supporting its Textbook Af-

fordability Project (University of South Florida Libraries, 2017).

The University of Florida is working towards providing OER accessibility to the instructors, students, and researchers. To achieve this goal, assessing the OER knowledge, perceptions, and experience of the campus stakeholders was the first step. This paper focuses on a survey developed by the Marston Science Library librarians at the University of Florida. The survey was administered to assess perceptions and use of OER among faculty, researchers, and students in STEM discipline colleges. The objectives of the survey are divided into several categories: 1) demographics; 2) level of knowledge on OER; 3) use of OER in instruction; 4) use of OER in research, and; 5) knowledge of library support. The survey aims to understand the users' knowledge, perceptions, and experiences using open educational resources for teaching and/or research initiatives at the UF campus.

Literature Review

The Open Educational Resources vision was initiated by a UNESCO forum in 2002 to enable the creation of free, universally accessible educational materials, which anyone could use for teaching or learning purposes. It was defined as, "the open provision of educational resources, enabled by information and communication technologies, for consultation, use, and adaptation by a community of users for non-commercial purposes" (UNESCO 2002, p. 24). Since then, many OERs have been created and licensed under

a Creative Commons license. The Minnesota Open book library, Washington State's Open Course Library, The Saylor Foundation, Affordable Learning Georgia, and open access journals are some of these unique resources. Although the number of OER's continues to increase, the acceptance of these resources in higher education remains in question and needs to be assessed. While valuable, many studies have examined the perceptions of faculty and researchers using anything they considered to be OER at many different levels (de los Arcos et al. 2016, Bliss et al. 2013, and Hilton 2016). Here, we will focus on literature documenting faculty perceptions of OER in higher education. Young (2015) presented a study regarding faculty perception and the use of OER in teaching and reported mixed responses. In Young's study, there existed a lack of available resources, time to locate OER, and upper-level course material was also sparse. Hilton (2020) published a synthesis of studies from twenty OER perception studies involving students and faculty. He concluded that most of the faculty and students who have used OER had a positive experience (Hilton, 2020). In another similar study, Warner studied various HBCU faculty perceptions of OER; Warner used the COUP assessment (Cost, Outcomes, Usages, and Perception) and concluded that faculty reported positive perceptions of OER (Warner, 2020). In two separate studies, Fine and Read (2020) and Lin (2019) examined factors influencing students' perceptions of OER and the impact of OER on students. They identified that pedagogical use of OER

increased students' access to education and fostered the development of self-directed skills and copyright awareness. Yuan (2019) developed an OER evaluation rubric to study the perceptions of OER among teaching and non-teaching personnel. Not surprisingly, teachers gave a higher rating to the OER in comparison to the non-teacher participants using the evaluation rubric. In a study by Morris-Babb and Henderson (2012) 2,707 faculty and administrators were asked to assess their familiarity with the OER in Florida. Most survey responders stated their unfamiliarity with OER textbooks. In a similar study reported by Murphy (2013), the survey results from 110 individuals from higher education worldwide indicate that although educators were interested in OER, they face challenges using them. The greatest challenge described was the lack of dedicated information about the OER support and the cost for redeveloping courses (Murphy 2013). These findings were similar to the study reported by McKerlich et al. (2013); the use and creation of OER were measured at the Athabasca University. Many of the faculty and staff who were surveyed (43%) accepted using OER, and 31% supported OER resource creation. Creating and supporting OER is important, but for faculty, students, and researchers to use OER, they not only need to be aware of the resources but also need to trust the quality of the resources (Allen & Seaman 2016). A seminal body of work the national study conducted by the Babson Survey Research Group states that "*most higher education faculty are unaware of open educational*

resources (OER)—but they are interested, and some are willing to give it a try" (Allen & Seaman 2016). However, according to their survey, fewer than 7% of faculty accepted using OER in their classroom. This is still relevant as a report published by Spilovoy, Seaman, & Ralph (2020) indicates; OER adoption is on the rise, and faculty and institution have shown increasing awareness and acceptance of OER but continue to struggle with unfamiliar with OER are, or how to utilize them. Faculty who are aware of OER are much more likely to include them in the curriculum. The report also mentioned, "The impact of awareness of OER initiatives on adoption remains consistent across types of institutions (two- and four-year), the level, of course, being taught, and across regional compacts in the U.S." (Spilovoy, Seaman, & Ralph (2020). K-12 school districts are skeptical about OER use; it makes only a small fraction of the resources used, although those who use OER, they rate the overall quality slightly better than commercial alternatives (Seaman & Seaman, 2020)

One driving force of OER is the Affordable CollegeTextbook Act (H.R.2017/S.1036) that seeks to expand the use open textbooks including open education resources to reduce the cost of traditional textbooks by offering alternative solutions. The H.R. 2017 Summary read in 2019 states: "*This bill directs the Department of Education to make grants to institutions of higher education or states to support projects that expand the use of open textbooks in order to achieve savings for students while maintaining or improving instruc-*

tion and student learning outcomes. An open textbook is an educational resource that either resides in the public domain or has been released under an intellectual license that permits its free use, reuse, modification, and sharing with others." Many states have passed their own versions of textbook affordability and this initiative is supported by the Association of Research Libraries, Association of College & Research Libraries and other academic associations. While there is support for this initiative, there are many challenges for this movement to be successful. Wang et al. (2017) described the challenges of OER adoption in higher education. Lack of awareness and lack of confidence in the technical and pedagogical quality and ownership questions were cited as the primary concerns. Many academic libraries are promoting OER using various strategies. Nann et al. shared their experience of promoting OER on two different campuses, the University of Central Florida and the University of San Diego. The main finding was that they need to educate stakeholders through continuous outreach for a successful promotional strategy (Nann et al., 2016). Allen et al. (2014) published a report on opening the curriculum and perception of OER in US higher education by examining faculty attitudes about OERs and how these attitudes changed over time. Results from the survey taken by 2,144 faculty revealed a) they were not aware of OER and its concept; b) OER awareness was not a prerequisite to OER adoption; c) OER were used for course content; and remarkably d) the quality of OER was considered roughly equiv-

alent to traditional sources. A most significant barrier to OER adoption was the requirement of time and effort to evaluate it (Allen et al., 2014). In a similar study with similar results, Jung et al. (2017) administered a survey on faculty use, perceptions, and quality of OER and found that most faculty perceived the OpenStax textbook's quality as the same as a traditional textbook. Today the U.S. Department of Education Office of Post Secondary Education offers a competitive grant "Open Textbook Pilot" (OTP) program. The goal of this grant is to develop open textbooks or to expand the use of open textbooks for high enrollment courses. The result would be cost savings passed down to students.

Methodology

To assess the perceptions of OER, an online survey comprising 11 questions was distributed to STEM faculty, researchers, graduate students, and visiting scholars to determine their knowledge and use of OER in teaching and research and OER acceptability and popularity within disciplines at the University of Florida. The survey initially included four groups: 1) faculty, 2) staff scientists (engineers, extension research center agents, and scientists), 3) graduate students, and 4) visiting scholars from four colleges, [College of Agricultural & Life Sciences (CALS), College of Design, Construction & Planning (CDCP), Herbert Wertheim College of Engineering (HWCOE), and the College of Liberal Arts & Sciences (CLAS)]. Due to the low response rates

of groups 2 and 4, the authors decided to combine the responses of the faculty ($n=73$) and the researcher/scientist/extension agent/engineer ($n=7$), and visiting scholar ($n=1$).

In addition to the demographic questions, nine questions included in the survey focused on understanding user experience in using open educational resources for teaching and/or research initiatives. The authors posit that the UF community uses OER differently for teaching/curriculum support and their research activities.

Results and Discussions

The demographic responses from both questions are combined for status and affiliation. The responders self-identified as researcher / faculty /scientists, student/postdoc, and stated their affiliation with STEM colleges (Fig. 2). Most responses tied themselves to the CALS, where students and faculty seem equally enthusiastic about the survey.

When surveyed about their level of knowledge of OER, the majority of respondents ($n=46$) believe they have an average understanding of OER (Fig. 3). Significantly few respondents indicated they have a far above average ($n=5$), followed by a somewhat above average ($n=13$) knowledge. This is followed by a combined slightly below average ($n=32$) and far below average ($n=17$). At every level, the faculty had more knowledge of OER than students. (Fig. 3).

While the current trend with OER in higher education focuses on the

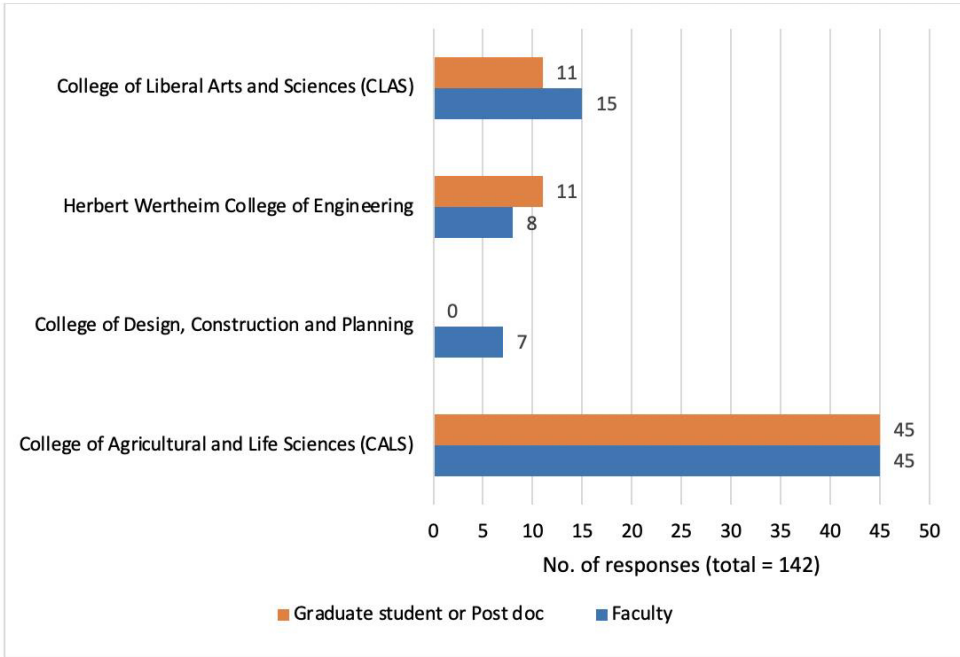


Fig. 2. Demographics of survey responders

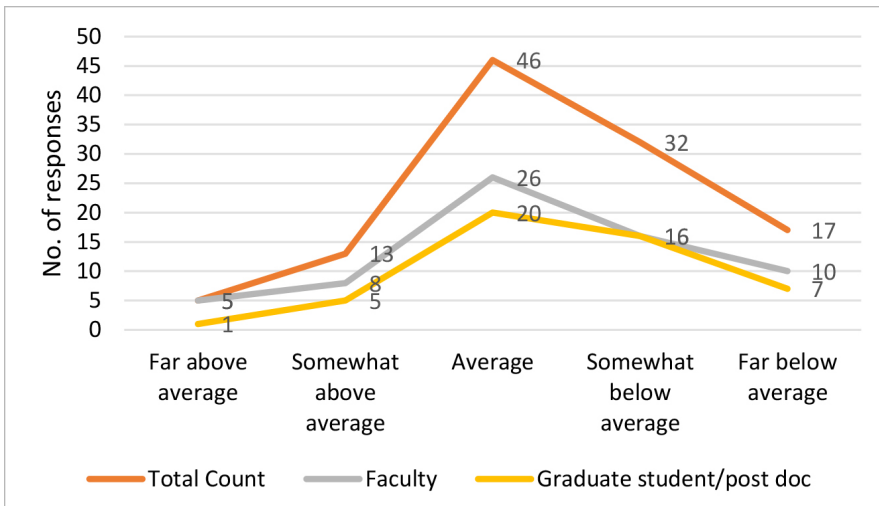


Fig. 3. Level of knowledge of OER

cost of textbooks and research material, this survey focuses on how faculty and graduate students use OER in their curriculum and research.

When using OER for instruction, students were way ahead of the

faculty (Fig. 4). Open Access articles are the most widely used OER by both faculty and graduate students. Graduate students were also the leading users of the open textbook and opensource software applications. One explana-

tion could be the drive for using Lynda.com and GitHub; more courses are using Open Source Software (OSS) for statistical purposes. Graduate students/postdocs readily use streaming videos

for instructional purposes. It is difficult to ascertain why more faculty are not using this medium; perhaps it is a lack of awareness or due to the difficulty of knowing where to locate such materials.

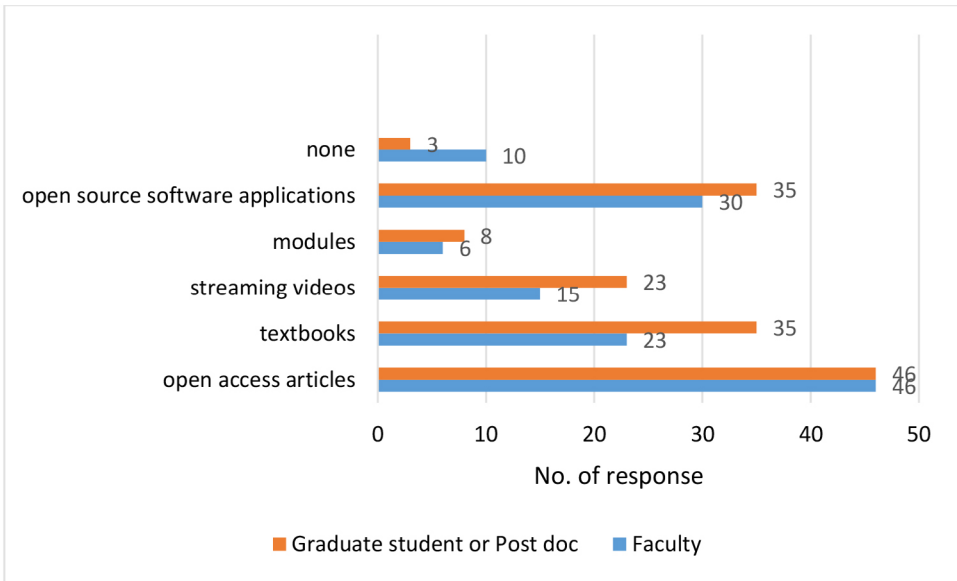


Fig. 4. Use of OER for instruction

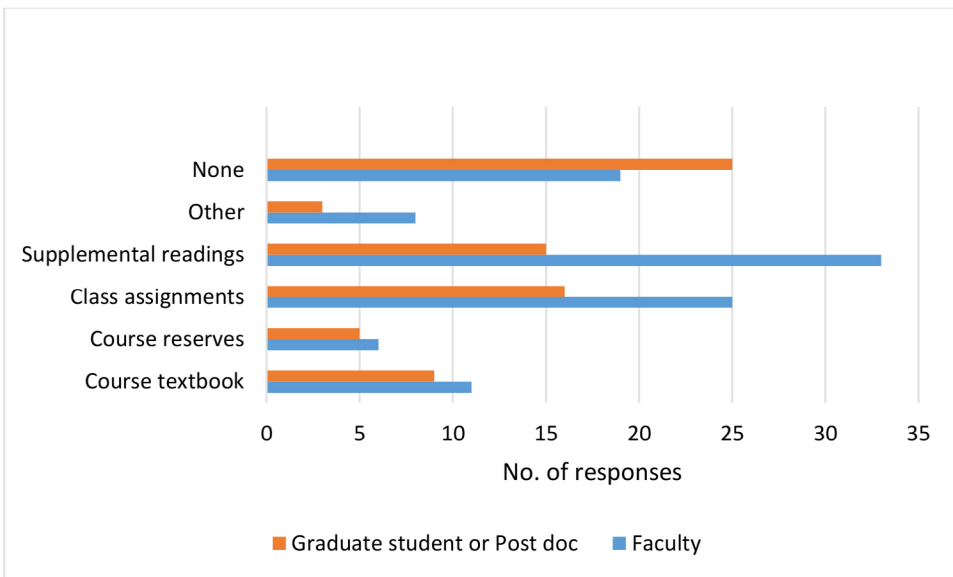


Fig. 5. How OER is incorporated into instructions

Contrasting the use of OER in instruction, the incorporation of OER in instruction told a different story. There is a considerable percentage of respondents who choose not to incorporate OER into instruction at all. Among the users, faculty members lead the charge by incorporating OER into instruction (Fig. 5). For faculty, the high use of OER materials is primarily for supplemental readings and class assignments, which is higher than the OER materials used by graduate students and postdocs for class assignments and supplement reading. Faculty and students also use

OER for course reserves and course textbooks.

We also asked about any potential barriers to not using OER, specifically in the curriculum (Fig. 6). The lack of time to review OER content and the unfamiliarity of the subject content that is found in OER materials were two significant barriers for the faculty. All barriers mentioned were personal/professional. We were surprised to learn that no faculty mentioned the departmental approval as an obstacle, which proves that awareness about OER can promote its use without administrative hindrance.

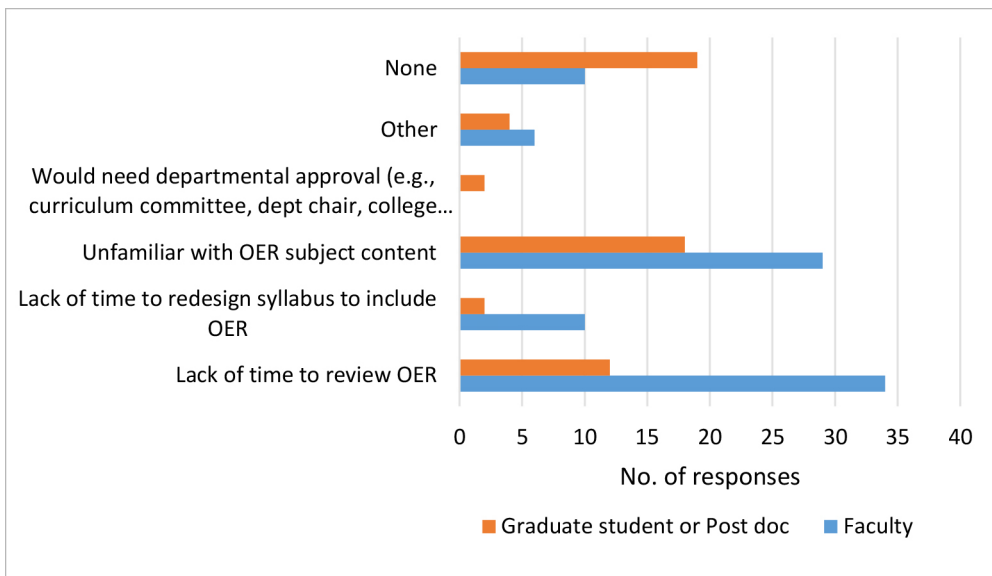


Fig. 6. Barriers for OER use in the curriculum

Also explored in the survey was how faculty and graduate students/post-docs use OER in various colleges in their research. Although most of the respondents identified in CLAS, they also represent the demographic that uses OER most frequently for research.

Not surprisingly, OA articles rank the highest, with some modules ranking the lowest (Fig. 7 & Fig. 8). This was not surprising as it confirms again that the faculty and students use open access articles for teaching and research (Fig. 4).

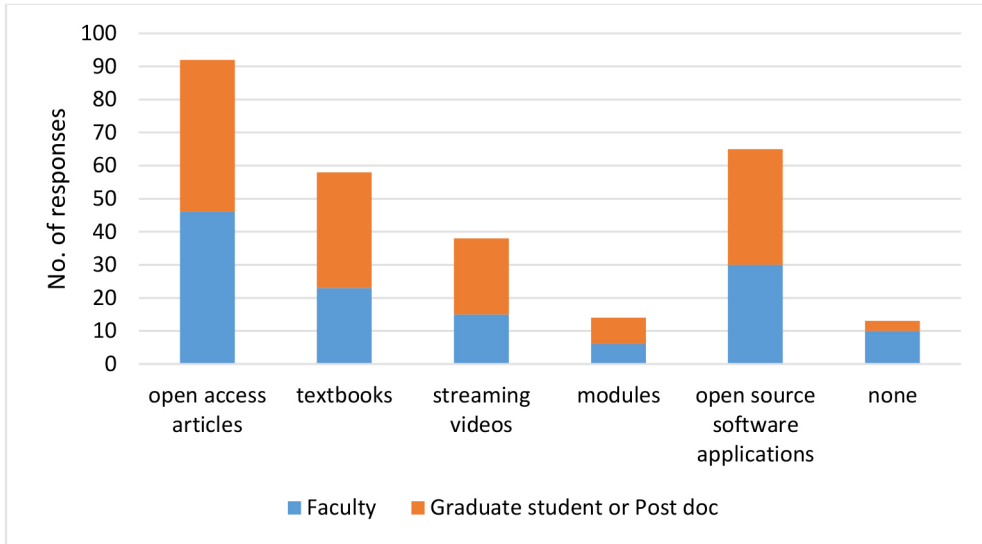


Fig. 7. Types of OER use in research

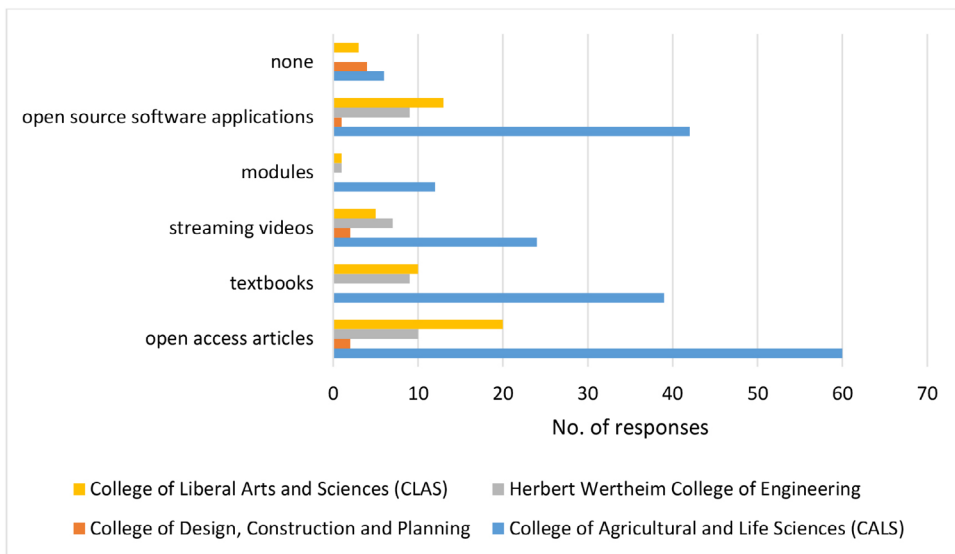


Fig. 8. Types of OER use in research by College

We also focused on how the respondents incorporate OER in their research and other scholarly activities, excluding instruction. The majority of faculty use OER materials in publishing books and journals ($n=35$), followed by citing in their grant activities

($n=24$) (Fig. 9).

The majority of graduate students incorporate OER materials into their thesis or dissertation ($n=32$), followed by publishing ($n=28$) (Fig. 10). A small number of students use OER for publishing directly on the web.

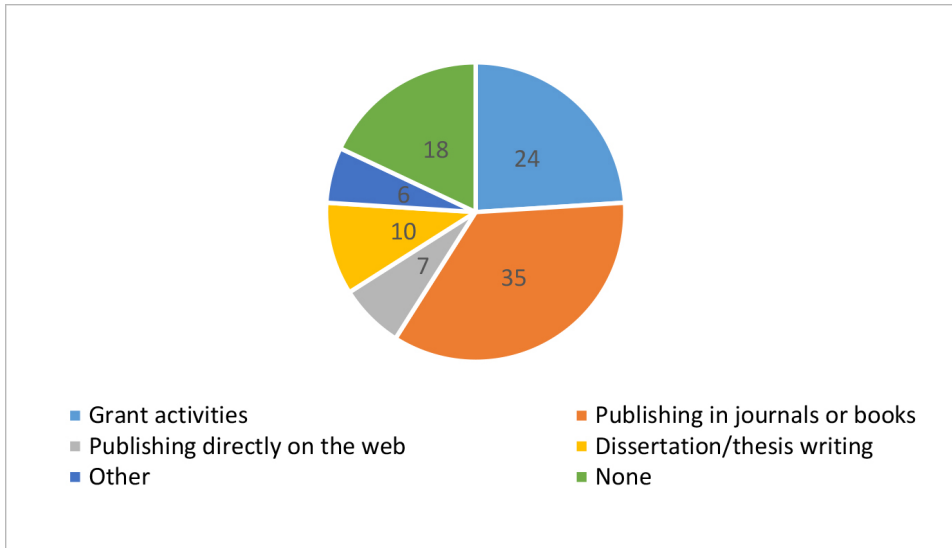


Fig. 9. Faculty use of OER in their research

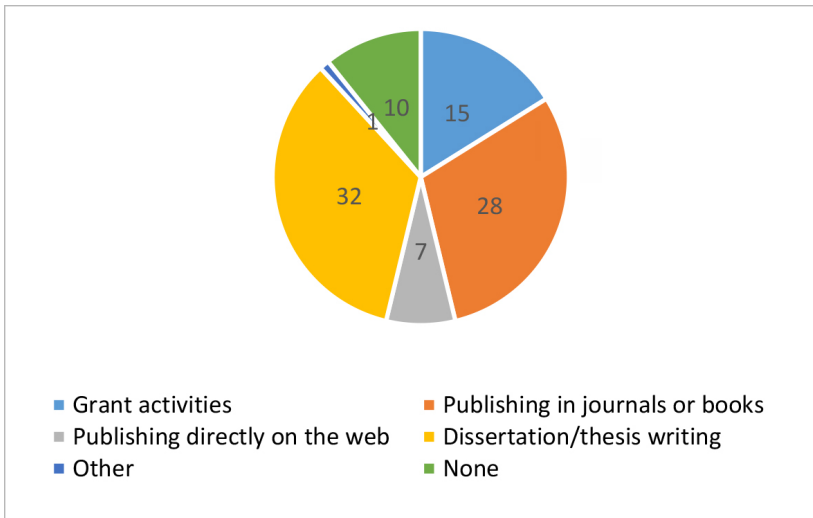


Fig.10. Graduate student/Postdoc use of OER in their research

One of the most critical questions we asked was why they use OER and how important do they think it is in their discipline? With the push for cost-effectiveness, it is not surprising that the majority of respondents identify the financial aspect of using OER as the primary reason for their use. Interestingly, faculty that use OER find that the content can be easily updated

or revised, although some faculty use OER for the quality of the content (Fig. 11). Contrasting these responses, graduate students and postdocs use the OER for content more than having the OER content being revised or updated. Some respondents do not use OER, which is an opportunity for libraries to enhance marketing and to raise awareness.

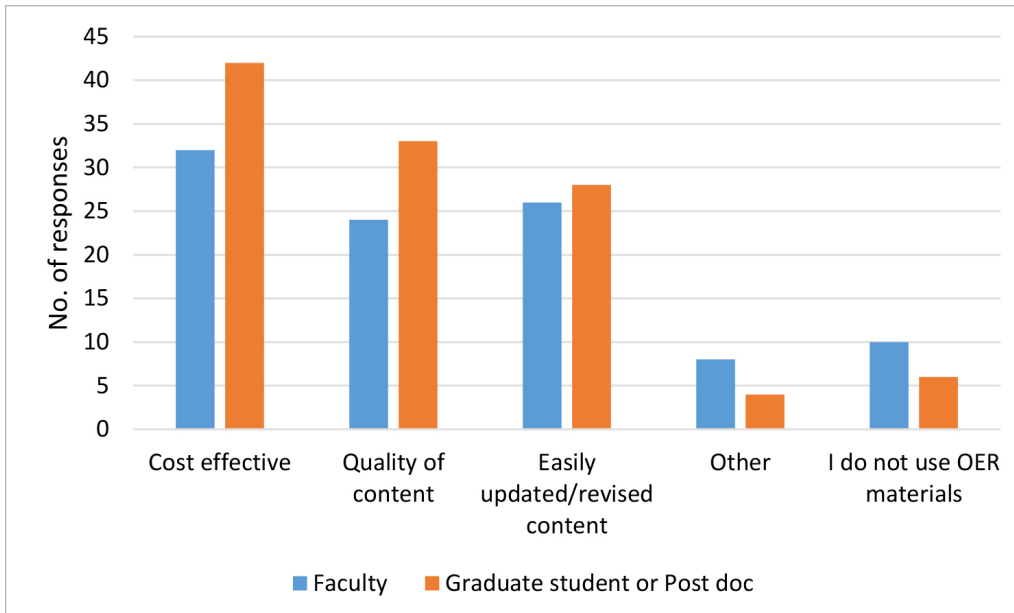


Fig.11. The reason why to use OER

It was evident from the survey that OER is an important resource for faculty and graduate students (Table 1). The use of OER is gaining importance in higher education with the availability of more resources (McKenzie 2017). The greatest challenge is how librarians can find a platform to initiate a conversation to work with campus stakeholders when identifying OER for the curricular and

research needs at the institutional level, and for library liaisons to work with academic departments they support to raise awareness about OER in any medium for a specific discipline or field of study. This final question is somewhat troubling internally for libraries but can be seen as an opportunity to create new marketing and branding initiatives that promote OER.

Table 1: How important are OER in academia as a whole or in a specific field of study?

	Number of faculty	Number of graduate students/post-docs
Extremely important	6	14
Very important	20	20
Moderately important	13	9
Slightly important	13	6
Not at all important	6	3

Table 2. Which library resources do you use to find OER (select all that apply)?

	Faculty	Researcher/Scientist/ Extension agent	Graduate student/ Postdoc
Library catalog	12	2	19
OER web resources	12	1	16
Other	10	1	5
Didn't know the library has OER in the catalog	35	2	19

The overwhelming majority of respondents didn't know that the library has OER materials accessible through the library catalog (Table 2). How do the UF Libraries solve this issue? There are many options, such as arranging discipline-specific OER workshops, creating OER collections, or using faceted search options. The library catalog cannot compete with Google Scholar, so the onus falls on the libraries to develop an easy-to-use tool and a searchable catalog, which is easier said than done.

Challenges in Promoting OER

Faculty Perspective

Introducing the use of OER into the curriculum is not without challenges. The positive aspects include free/reduced educational resources in multiple formats, but there are many underlying faculty concerns about OER. Aside from the lack of familiarity, most OERs are geared toward lower undergraduate levels in subjects such as physics, chemistry, and biology, so there may not be acceptable materials at the upper level, graduate, or niche disciplines. Another

consideration is that in some institutions, any changes to the core curriculum need to be vetted by curriculum and faculty committees, which could take up to a year or more if approved, not including the time required to redesign entire sections of classes. Faculty also may be hesitant to adopt OER due to lack of time to properly evaluate the materials' scope, coverage, and accuracy. Additionally, if faculty are using a textbook that they wrote, there could be some financial considerations (i.e., royalties).

Library Perspective

It may be challenging to assess OER in the library collection from a library perspective, and given that some disciplines offer more OER, there could be an imbalance in core collections. Another challenge is discoverability in the library catalog. The MARC records may not offer call numbers or subject headings for broad categories. The big question is if the OER should be a separate collection that is easily identifiable or be blended in with the entire collection? From a usability standpoint, the features and functionality of using an

OER must be taken into consideration. If the material is not easily accessible, then the user will be reluctant to use the material. Assessment of OER and usage statistics may also prove challenging. Libraries must develop a consistent policy statement on how OERs are marketed and supported at their institution and within the library. They must seek out the partner with departments or faculty who are currently using OERs or support their use assess performance/usage measures through case studies.

Implications and Strategies

Libraries should support the higher education initiative to reduce the price of textbooks and research materials. To accomplish this, libraries should make OER available for courses and research, where applicable, and promote the use of OER as supplemental resources for curriculum support. Libraries should strive to list OER, in any format, in the library catalog or collections that can be easily searched. When libraries support the OER initiative, there may be a benefit to collaborate more closely with faculty to discover the value of OERs in higher learning. In one case, we worked with a professor who wanted to include only open textbooks and reading material for her new course.

Here are a few considerations:

- Does the campus community (librarians, students, faculty, and researchers) know about OER? If not, develop a marketing and branding campaign.
- Do faculty and students know how to access OER through your library catalog? How are these materials cataloged? Are they easily accessible and easily searchable?
- What are the institutional goals (current or in the process of) to promote awareness of OER? Does the library include OER in their collection management, technical services, or public services goals and objectives? Are these goals/objectives supportive of the institutional goals? How can the library play a role in curriculum and research support at the institutional level?
- If librarians are involved in OA/OER collections, which collection areas are of the most significant interest? How can collection policies be developed based on a *just-in-time* approach?

Conclusion

This survey attempted to better understand how the UF STEM faculty and graduate students/postdocs perceive their knowledge and use of OER in the classroom and research activities. Based on the results, the respondents recognized the importance of OER. They used these materials in research/scholarly activities and instruction, but not as a primary or only source of knowledge. There is still a big part of the faculty and student community unaware of OER content and access. The majority of respondents do not know that the libraries offer OER collec-

tions through the UF library catalog. This is an excellent opportunity for the library to educate users on the availability of OER. This information will challenge the library community to think about how to best brand, market, and provide sustainable collections of OERs to support their institution's mission.

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References

Allen, I. E., & Seaman, J. (2014). Opening the curriculum: Open educational resources in U.S. higher education, 2014. Babson Survey Research Group, Babson College, 231 Forest Street, Babson Park, MA 02457. <https://files.eric.ed.gov/fulltext/ED572730.pdf>

Allen, I.E., & Seaman, J. (2016). Opening the Textbook: Educational Resources in U.S. Higher Education, 2015-16 (Babson Survey Research Group), <http://www.onlinelearningsurvey.com/reports/openingthetextbook2016.pdf>

Bliss, T., Robinson, T., Hilton, J., & Wiley, D. (2013). An OER COUP: College teacher and student perceptions of open educational resources. *Journal of Interactive Media in Education*, 2013(1) part 4. <http://doi.org/10.5334/2013-04>

de los Arcos, B., Farrow, R., Pitt, R., Weller, M., & McAndrew, P. (2016). Personalizing learning through adaptation: Evidence from a global survey of K-12 teachers' perceptions of their use of open educational resources. *Journal of Online Learning Research*, 2(1), 23-40. <https://www.learntechlib.org/primary/p/151664/>

Fine, M. B., & Read, H. (2020). Factors impacting student perception of open educational resources. *The e-Journal of Business Education & Scholarship of Teaching*, 14(1), 151-173. [https://www.ejbest.org/upload/e-JBEST%2010%20Fine%20&%20Read%2014\(1\)%202020%20.pdf](https://www.ejbest.org/upload/e-JBEST%2010%20Fine%20&%20Read%2014(1)%202020%20.pdf)

GovTrack.us. (2021). H.R. 2107 — 116th Congress: Affordable College Textbook Act. Retrieved from <https://www.govtrack.us/congress/bills/116/hr2107>

Hilton, J. III. (2016). Open educational resources and college textbook choices: A review of research on efficacy and perceptions. *Educational Technology Research and Development*, 64(4), 573-590. <https://link.springer.com/article/10.1007/s11423-016-9434-9>

Hilton, J. (2020). Open educational resources, student efficacy, and user percep-

tions: A synthesis of research published between 2015 and 2018. *Educational Technology, Research and Development*, 68(3), 853-876. file:///Users/nbharti/Downloads/Hilton2020_Article_OpenEducationalResourcesStuden.pdf

Jung, E., Bauer, C., & Heaps, A. (2017). Higher education faculty perceptions of open textbook adoption. *International Review of Research in Open and Distributed Learning*, 18(4), 123-141. DOI: <https://doi.org/10.19173/irrodl.v18i4.3120>

Lin, H. (2019). Teaching and learning without a textbook: Undergraduate student perceptions of open educational resources. *International Review of Research in Open and Distributed Learning*, 20(3). <https://www.erudit.org/en/journals/irrodl/2019-v20-n3-irrodl04799/1062519ar.pdf>

McKenzie, L. (2017). OER adoption on the rise. *Inside Higher Ed*. Retrieved from <https://www.insidehighered.com/news/2017/12/19/more-faculty-members-are-using-oer-survey-finds>

McKerlich, R., Ives, C., & McGreal, R. (2013). Measuring use and creation of open educational resources in higher education. *The International Review of Research in Open and Distance Learning*, 14(4), 90-102. <https://www.erudit.org/en/journals/irrodl/2013-v14-n4-irrodl05094/1066901ar.pdf>

Morris-Babb, M., & Henderson, S. (2012). An experiment in open-access textbook publishing: Changing the world one textbook at a time. *Journal of Scholarly Publishing*, 43(2), 148-155. <https://www.utpjournals.press/doi/abs/10.3138/jsp.43.2.148>

Murphy, A. (2013). Open educational practices in higher education: Institutional adoption and challenges. *Distance Education*, 34(2), 201-217. <https://www.tandfonline.com/doi/abs/10.1080/01587919.2013.793641>

Nann, A., Hess, J. I., Norris, S., & Raible, J. (2016). A Tale of Two Campuses: Open Educational Resources in Florida and California Academic Institutions (2016). *Proceedings of the Charleston Library Conference*. <http://dx.doi.org/10.5703/1288284316491>

Seaman, J. E., & Seaman, J. (2020). *What We Teach: K-12 Educators' Perceptions of Curriculum Quality*. Retrieved from https://www.onlinelearningsurvey.com/reports/k-12_whatweteach.pdf

Spilovoy, T., Seaman, J., & Ralph, N. (2020). *The Impact of OER Initiatives on Faculty Selection of Classroom Materials*. Retrieved from <https://www.onlinelearning survey.com/reports/impactofocerinitiatives.pdf>

The Hewlett Foundation (2018). Open Educational Resources, <http://www.hewlett.org/programs/education-program/open-educational-resources>.

UNESCO. (2002). Forum on the impact of open courseware for higher education in developing countries. Final report. Retrieved from www.unesco.org/iiep/eng/focus/opensrc/PDF/OERForumFinalReport.pdf

United States Department of Education. (2020). Open Textbooks Pilot Program. <https://www2.ed.gov/programs/otp/index.html>

University of South Florida Libraries (2017). Textbook Affordability Project. <http://tap.usf.edu/>

Wang, T., & Towey, D. (2017). Open educational resource (OER) adoption in higher education: Challenges and strategies. *2017 IEEE 6th International Conference on Teaching, Assessment, and Learning for Engineering (TALE)*, Hong Kong, 2017, pp. 317-319. <https://ieeexplore.ieee.org/document/8252355>

Warner, T. L. (2020). Analysis of HBCU faculty awareness and perceptions regarding open educational resources (OER) for teaching enhancement (27743831). Available from Coronavirus Research Database; ProQuest Central; ProQuest Dissertations & Theses Global. (2468704812). <https://pqdtopen.proquest.com/doc/2468704812.html?FMT=ABS>

Young, B. (2015). Assessing Faculty Perceptions and Use of Open Education Resources (OERs). ACRL 2015 Conference Proceedings, <http://www.ala.org/acrl/sites/ala.org/acrl/files/content/conferences/confsandpreconfs/2015/YoungB.pdf>

Yuan, M., & Recker, M. (2019). Does audience matter? comparing teachers' and non-teachers' application and perception of quality rubrics for evaluating open educational resources. *Educational Technology, Research and Development*, 67(1), 39-61. https://digitalcommons.usu.edu/itls_facpub/636/

APPENDIX I

Original Survey Instrument

A Study of STEM Usage and Perceptions of OER at a Large Research University

Open Educational Resources: Survey

Q1 Thank you for choosing to participate in our UF Libraries Science Collections - patrons perspectives survey. We wish to understand user experience in using open educational resources (OER) for teaching or research. The Hewlett Foundation defines OER as “teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. OER include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.” (<http://www.hewlett.org/programs/education-program/open-educational-resources>).

We appreciate your feedback. The survey is anonymous and will take less than 5 minutes. The results of the survey are important as the libraries strive to build better collections to support research and curriculum activities. Please click the “>>” button below to continue.

Q2 Select your primary status at UF (select one option)

- Faculty
- Researcher/Scientist/Extension
- Graduate Student OR Post Doc
- Visiting Scholar

Q3 Please identify your primary department at UF

Q4 Please rate your level of awareness of OER materials:

Q5 Have you ever used OER materials for instruction or research? Y N IDK

If No Is Selected, Then Skip To End of Survey Q9

Q6 If yes, please select which type of OER materials you use
(take from definition list)

Q7 Why do you use OER materials?

Cost effectiveness

Quality of content

Easily updated/revised content

Other

Q8 Which library resources do you use to find OER materials?
(select all that apply)

Library catalog

OER web resources

Other _____

Didn't know the library has OER materials in the catalog

Q9 How do you incorporate OER in your research/scholarly activities?
(select all that apply)

Grant activities

Publishing in journals or books

Publishing directly on the web

Dissertation/thesis writing

Other _____

None

Q10 How do you incorporate OER into instruction? (select all that apply)

Course textbook

Course reserves

Class assignments

Supplemental readings

- Other _____
- None

Q11 What are the barriers for using OER in your curriculum? (select all that apply)

Lack of time to review OER materials

Lack of time to redesign syllabus to include OER materials

Unfamiliarity with the OER subject material

Would need departmental approval (curriculum committee, dept chair, college level)

Other

None

Q12 How important are Open Educational Resources in your work or field of study.

- Extremely important
- Very important
- Moderately important
- Slightly important
- Not at all important
- Don't know

Q13 Thank you for taking the time to complete this survey. For more information on Open Educational Resources, you may provide your email so a librarian can follow up, or please copy this link into a separate browser:

<http://guides.uflib.ufl.edu/c.php?g=147544&p=968355>
