Library Facilitation of eTextbooks in Engineering Classes: Student Adoption & Perception

Ms. Leena N Lalwani, University of Michigan

Leena Lalwani is an Assistant Director, Engineering & Coordinator for Engineering & Science collections at the Art, Architecture and Engineering Library (AAEL) at the University of Michigan. She is also the liaison Librarian for Chemical Engineering, Materials Science, Naval Architecture and Marine Engineering and Entrepreneurship. Leena has been a librarian at University of Michigan since 1995 in various ranks. Prior to joining University of Michigan, Leena has worked as Librarian at Gelman Sciences and American Tobacco Company. Leena has a M.L.S. degree from Catholic University of America and M.S. in Chemistry from the University of Mumbai.

Mr. Paul F. Grochowski, University of Michigan

Paul Grochowski is an engineering librarian at the University of Michigan. He holds a bachelor's degree from the University of Michigan and a MLIS degree from Wayne State University.

Jamie M. Niehof, University of Michigan

Engineering Librarian Computer Science, Nuclear Energy, Climate & Space Science University of Michigan — Ann Arbor

Dr. Craig E Smith, University of Michigan

I received a doctorate in Human Development and Psychology from the Harvard Graduate School of Education, and then trained as a postdoc in the Harvard and University of Michigan psychology departments. I have conducted institutional research at the University of Michigan, and I started my current work as the Assessment Specialist in the U-M Library in the spring of 2018.

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Abstract

As a means of aiding students who struggle with the high cost of textbooks, some libraries now leverage their ebook subscription packages to provide eTextbooks for courses. At the University of Michigan, the engineering librarians routinely offer ebook versions of engineering textbooks whenever possible. Although this institution has been following this principle for the past ten years, it has done so with little direct knowledge of students' preferences regarding their options for print versus ebook format for their textbooks. Some studies have shown that students expressed a preference for using their textbooks in print format. To assess the usefulness of the service of providing eTextbooks, in the Fall 2019 semester the engineering librarians at the University of Michigan developed and sent a survey to engineering graduate and undergraduate students whose textbooks were available as eTextbooks. The survey sought to learn about students' use of the ebooks and their opinions about eTextbooks. As a follow up to the survey, the librarians met with two focus groups who provided more qualitative information on student use of eTextbooks. Survey and focus group results may inform not only changes to the service of providing eTextbooks, but also can be shared with publishers to potentially inform improvements to ebook platforms. This paper reports on the results of the survey and focus group and implications for the future.

Introduction

In the early 2000s, ebooks became available to academic libraries [1] and the wider world. The University of Michigan Library subscribed to a package of Netlibrary ebooks in the year 2000, and has continued providing and increasing access to ebooks over the ensuing 20 years. This emphasis on collecting in ebook format led to the majority of the engineering print collection from the Art, Architecture & Engineering Library (AAEL) being relocated to remote shelving in 2017. Our current acquisition strategy for the engineering collection is almost entirely based on subscription ebook packages from major vendors and publishers and an occasional à la carte individual ebook purchase.

The College of Engineering (CoE) at the University of Michigan had an enrollment of 10,079 students (6,442 undergraduates and 3,637 graduates) as of Fall 2019. These students participated

in 674 lecture courses offered through the CoE. Working from faculty requests and campus bookstore information, library staff identified 210 books that were assigned in these courses. Book lists were available for only 119, or approximately 18 percent, of the classes. Of the 210 books used in these classes, 93 were available to students as part of the library ebook collection.

Beginning ten years ago, understanding that textbook cost was a major concern to students, the engineering librarians at AAEL made a concerted effort to identify engineering course textbooks that were assigned in classes and also available in library-provided ebook subscription packages. We then began actively promoting these eTextbooks to the CoE faculty and student population. To assess this new service, surveys were conducted in 2011 and 2012 to gather information on student awareness and perceptions of eTextbooks.

As a follow-up to the two surveys from 2011 and 2012, and to assess current student perception, use, and preferences with regard to eTextbooks and their print counterparts, we conducted a new survey and moderated two focus groups made up of students who used selected eTextbooks in the Fall of 2019. The survey asked questions related to format preference (electronic versus print), what students liked about each format, devices used to access eTextbooks, problems with eTextbooks, and more. We used the focus groups to learn more about specific themes that arose from survey responses.

Literature Review

As Waters et al. stated in 2014, "E-books are ubiquitous," [2] and many studies [3], [4], [5] have been done over time to learn about students' use of ebooks and their preferences between ebook and print book formats.

The Waters study, reported in 2014, found that 61 percent of survey respondents preferred print format to electronic [2]. The study went on to ask about advantages and disadvantages of the ebook format. Advantages noted by respondents included, "…available from anywhere at any time…" and the ability to search the full text. Disadvantages included "…the difficulty of reading on a screen," and also that reading ebooks required "…a computer or other device…" [2].

Cummings, Larrivee, and Vega [6] conducted a study to compare preferences between students of different academic disciplines. In their study, published in 2015, the authors surveyed students in engineering, in art, and in social sciences and found 35 percent of respondents in engineering and social sciences preferred the electronic format, while only 25 percent of respondents in art preferred the ebook [6]. One conclusion of this study was that "it is…important to consider the differences in research habits between the disciplines." [6]

Millar and Schrier [7] wrote in 2015 that their study asked the question, "Which do students prefer and why," specifically as it related to textbooks. A majority of their survey respondents "…indicated that they would choose a printed copy of a textbook," and "…fewer than 25% stated they would choose an e-textbook" [7].

The study published in 2018 by Aharony and Bar-Ilan [8] was interesting in that it tested four hypotheses: "Students will prefer printed academic materials…; The higher the advantage of academic e-reading seen by the students, the more they will prefer to use electronic devices; The higher students' comprehension of academic electronic materials is, the greater their preference for using electronic materials; and Both deep and surface learners will acknowledge the relative advantage of academic electronic materials" [8]. They conclude that "…the study findings demonstrate that students prefer academic printed materials…," yet, "…both deep and surface learners admit to the relative advantage of academic electronic materials" [8].

As is the case at the University of Michigan, some librarians [9], [10], [11] have investigated the idea of using library collections to give students free access to their course textbooks. Quoting Senack, who says, "65% of students said that they had decided against buying a textbook because it was too expensive," [12], Boczar and Pascual write about an "E-books for the Classroom" program at the University of South Florida where the library "purchases the e-book version of a text that is needed for a course" [9].

At the University of Minnesota, the Interlibrary Loan and Course Reserve departments collaborate on a service to fill student requests for required course materials [10]. The University of Buffalo Libraries began an e-Textbook Initiative in 2012, whose goals were to "…reduce textbook costs for students…and to explore equitable, sustainable business models for e-textbooks" [11].

Rokusek and Cooke state, "Textbook affordability has been a critical issue in higher education for decades, and rising textbook prices continue to place a burden on college and university students" [12]. Their study at Florida Gulf Coast University sought to determine, among other questions, "what percentage of [course-adopted texts] in the social sciences are available for purchase as a suitable e-book?" [12]. Looking at 152 titles, they find only 27, or 17.7 percent, with suitable e-books [12].

Methodology

This study used a sequential explanatory mixed-methods [14] approach, wherein a survey yielding mostly quantitative data was followed by two focus groups that provided rich qualitative

data. This type of design places the quantitative findings alongside participants' reasoning, providing important context and explanation for the numerical trends. Prior to collecting data, the study team received an exemption from the University's institutional review board, indicating that the study posed little risk to participants and did not involve vulnerable populations.

Survey Methodology

The survey was designed and implemented using the online survey tool Qualtrics and was sent to a targeted list of students. To identify students to include in the survey, librarians first looked at their webpage list of eTextbooks for engineering classes for the Fall 2019 semester. Fifty-four classes were listed. When selecting classes to include in the survey, librarians first selected only classes with required textbooks. To increase the sample size, librarians later considered classes whose textbooks were optional after first consulting with class faculty. This left a sample size of 48 classes. Because in some cases multiple classes were using the same book, the sample number of books was 39.

By working with the University Library's Assessment Specialist, it was possible for us to generate a list of 1,974 students who were enrolled in the selected classes. In the instances where students were enrolled in more than one of the selected classes and slated to receive multiple surveys, librarians removed duplicates, leaving a list of 1,849 students selected to receive surveys. Qualtrics allowed for machine inputting of course numbers and book titles, so that each student's copy of the survey referred by name to the specific eTextbook title that the student was using in class.

An example of what students saw in their personalized surveys:

> Your textbook for AEROSP 574, *Physics of the Space Environment*, is available from the library, did you use this book as an eTextbook?

Respondents were offered the incentive of an opportunity to receive one of eight $40 gift cards, selected by random draw of students who responded to the survey. The survey was open for four weeks in November 2019.

We received 368 completed surveys, for a response rate of 20 percent. The survey included a test question designed to determine whether students were truly reading the survey questions before responding. Surveys where this question was answered incorrectly were omitted from the results, as were surveys that were started but not completed. This data cleaning resulted in 335 usable

responses. Data were exported from Qualtrics and analyzed using SPSS software, designed for statistical analysis. Survey questions can be found in Appendix A.

Focus Group Methodology

All students who completed the survey were asked if they wanted to participate in a focus group, moderated by the engineering librarians, to share additional thoughts and experiences related to eTextbooks. Sixty-two students expressed interest. The focus groups were scheduled during lunchtime, so we were able to offer food and beverages as incentives. As focus groups were held at the beginning of December and coincided with exam preparation, attendance was not as high as we had hoped. Ten students had schedules that allowed them to participate over the two sessions, and they represented five out of the 13 CoE departments. Six students were graduate students, and four were undergraduate students. The inclusion of these students in the focus groups was based solely on their availability and not on their class standing or home department. Focus group questions can be found in Appendix B.

Survey Results

Survey and focus group results are discussed below. Where appropriate, results from both methods may be discussed together to provide context.

Of the 335 respondents in the final data set, 222 were undergraduate students and 113 were graduate students. This split of 66.3 percent undergraduate students and 33.7 percent graduate students is proportionate to the CoE's undergraduate to graduate student ratio.

The survey included a question about whether students had a disability that affected interactions with text and/or printed material. Six students identified as having such a disability. Due to the small number of affirmative responses, this variable was not suited for formal statistical analysis.

As is the case with many academic libraries, this library subscribes to ebook content on several platforms. Ebook platform distributions and book counts that were covered by the survey are shown in Table I.

TABLE I
STUDENT RESPONSES BY EBOOK VENDOR

EBOOK VENDOR	# of Respondents	Books
ScienceDirect	65	7
EBook Central	61	8
Cambridge Core	49	4
SpringerLink	48	5
Safari	47	4
Wiley	17	4
Skillsoft	15	2
Knovel	13	1
Taylor & Francis	12	1
AccessEngineering	7	2
EBSCOHost	1	1

Numbers in Table I represent the number of books from each platform that were included in the survey and the number of survey responses on books from each platform.

In the survey results that follow, please note that where students could select more than one answer, or where numbers are rounded, percentages as shown do not always sum to one hundred.

Students were first asked, “If one of your course textbooks was available in both print and electronic formats, which would you prefer?” Results are shown in Table II.

TABLE II
STUDENT PREFERENCE FOR TEXTBOOK FORMAT

PREFERENCE?	Responses	Percent
eTextbook	126	37.6
Print Textbook	117	34.9
Both Equally	85	25.4
Do Not Use Textbooks	7	2.1

We next analyzed book format preferences as a function of class standing (undergraduate versus graduate student); these results are displayed in Table III. A chi-square analysis indicated that there was a significant difference between undergraduate and graduate students, $\chi(2, N = 328) = 7.01, p = .03$. Post hoc 2×2 chi-square analyses were used to clarify this result, and a key finding was that the undergraduates were significantly more likely than graduate students to prefer eTextbooks over print textbooks, $\chi(1, N = 243) = 6.04, p = .01$.

TABLE III
PREFERENCES FOR TEXTBOOK FORMAT AS A FUNCTION OF STUDENT TYPE

ACADEMIC LEVEL	Print Textbook	eTextbook	Both
Undergraduates	70 32.4%	94 43.5%	52 24.1%
Graduate Students	47 42%	32 28.6%	33 29.5%

Students who expressed a preference for eTextbooks were then asked “What do you like about eTextbooks?” Likewise, students who preferred print textbooks were asked, “What do you like about print textbooks?” Display logic in the survey directed students who liked “both equally” to answer both of these questions about the bases of their preferences. Results are shown in Table IV and Table V. Students were provided some set response options plus an open-ended response option, and were allowed to select all responses that applied to them.

TABLE IV
PREFERRED PRINT TEXTBOOK FEATURES

WHAT DO YOU LIKE ABOUT PRINT?	Responses	Percent
Like to read on paper	169	83.7
Easy to navigate	152	75.2
Like to write in book / highlighting	66	32.7
Want to use books long term	48	14.3
Other	23	11.4

Students who preferred print textbooks (or both formats) especially liked the experiences of reading on paper and navigating in a physical book, with a substantial number also liking the ability to make notes and highlight on print book pages. Students who selected “other” shared responses in a free-text field. Out of the 23 “other” responses, librarians identified the three most interesting and insightful. Those responses included:

- Reading textbooks on a laptop strains my eyes, and I don't like repeatedly tabbing between windows to read a textbook and other online resources I need to read on one single monitor.
- Getting a physical book makes it more serious and makes me want to study. Not that I've used the print textbook very often.
- It is much easier to remember where in the book you saw something important with a physical copy than it is electronically.

TABLE V
PREFERRED ETEXTBOOK FEATURES

WHAT DO YOU LIKE ABOUT ETEXTBOOKS?	Responses	Percent
Like the portability of eTextbooks	189	89.6
Easy to navigate	128	60.7
Can take notes / highlight	61	28.9
Like to read on a screen	25	11.8
Other	36	17.1

Students who preferred eTextbooks (or both formats) especially liked the portability of electronic texts and the navigation experience, with many students also citing the ability to take notes and highlight in the electronic book format. Students who selected "other" shared responses in a free-text field. Out of the 36 "other" responses, librarians identified the three most interesting and insightful. Those responses included:

- I like the search feature so it's easier to look things up. I also use it on my iPad so on the left side of the screen I have the textbook and on the right side I can have lecture slides or my homework.
- Having a control-F function. The ability to take screenshots of a page with a graph and then print that off to do problems.
- For well-formatted eTextbooks, they're very navigable, but this demands skepticism as many are poorly formatted, missing key parts like indexes and the like.

Following these general questions about students' preferences, the survey moved on to ask questions about their experiences with the specific books used in their classes. After a filter question verified that each respondent was in the focal class and had been assigned the focal textbook, the first in this series of questions asked:

> Your textbook for [course], titled [book title], is available as an eTextbook, free from the university.
>
> Which is true of you?
> - I knew there was an eTextbook version, and knew it was free
> - I knew there was an eTextbook version, but didn't know it was free
> - I didn't know there was an eTextbook version

TABLE VI
STUDENT AWARENESS LEVEL OF FREE TEXTBOOK AVAILABILITY

DID YOU KNOW ABOUT THE ETEXTBOOK?	Responses	Percent
I knew about the free eTextbook	206	64.2
I didn’t know about the eTextbook	72	22.4
I knew about the eTextbook, not that it was free	43	13.4

More than 75 percent of respondents were aware of the eTextbook, with roughly two-thirds indicating that they also knew it was free through the university. For these latter students, the survey then asked, “How did you learn about the free, university-provided copy of this eTextbook?”

TABLE VII
PATHWAYS TO STUDENT AWARENESS OF FREE ETEXTBOOK

HOW DID YOU LEARN ABOUT THE ETEXTBOOK?	Responses	Percent
Announcement from instructor	152	73.3
Course syllabus	110	53.4
Fellow students	36	17.5
Searched in library catalog	33	16
Library webpage	10	4.9

Of the students who were aware of the free eTextbook, nearly three-quarters heard about the availability through announcements from their instructors, and roughly half saw the information about the textbook on their course syllabi.

One impetus for this survey was to determine the usefulness of the library's service in providing and publicizing eTextbooks. Publicity efforts by the library included listings of free ebooks on the library webpage and direct promotion to students by talking with students at a table in a high-traffic public area on the first day of class. The most important method of publicity is liaison librarians' direct outreach to faculty. In classes for which an eTextbook is available, we write to each faculty member in the week leading up to class and ask the faculty to make an announcement in class about the eTextbook. Some faculty members then include that information on their course syllabi. It was informative to see that all of these means of publicity showed up in students' open-ended responses to the question about how they learned about the free eTextbook (students were given an 'other' option for this question). For example, two students providing such responses did indeed note the tabling done by librarians.

For students who knew about the eTextbook, the survey asked when they first learned about the availability of this textbook option.

TABLE VIII
TIMING OF STUDENT AWARENESS OF FREE ETEXTBOOK

WHEN DID YOU LEARN?	Responses	Percent
The first day of class	127	62
Before the first day of class	48	23.4
After class started	30	14.6

Most respondents (85.4 percent) learned about the eTextbook on or before the first day of classes and knew of the option in time to decide whether to purchase print copies of their textbooks from the campus bookstore.

Next, students were asked which book format—print, electronic, or both—they had actually used for their engineering class, and how they accessed that selected format. Display logic in the survey ensured that students answered access questions only about formats they had earlier in the survey indicated that they had used.

TABLE IX
ETEXTBOOK ACCESS METHODS

HOW DID YOU ACCESS THE ETEXTBOOK?	Responses	Percent
ETEXTBOOK: Free from the library	144	85.2
ETEXTBOOK: Other online source	39	23.1
ETEXTBOOK: Purchased or rented	2	1.2

The large majority (85.2 percent) of students who used the eTextbook reported accessing the free version via the library. One interesting result from responses to this question was that 23.1

percent of respondents stated that they accessed their eTextbooks from an “other online source.” To gain more insight into what this meant, we explored this option more deeply in our post-survey focus groups.

TABLE X
PRINT TEXTBOOK ACCESS METHODS

HOW DID YOU ACCESS THE PRINT TEXTBOOK?	Responses	Percent
PRINT: Purchased or rented	56	81.2
PRINT: Borrowed from peer	10	14.5
PRINT: Borrowed from the library	7	10.1

Although this survey was focused on students' use of eTextbooks, these results offered a brief look into students' behaviors in regard to how those who used books in print format accessed their textbooks.

Next, students were asked about devices they used to read eTextbooks. Students were allowed to choose more than one answer.

TABLE XI
DEVICES USED BY STUDENTS TO READ ETEXTBOOK

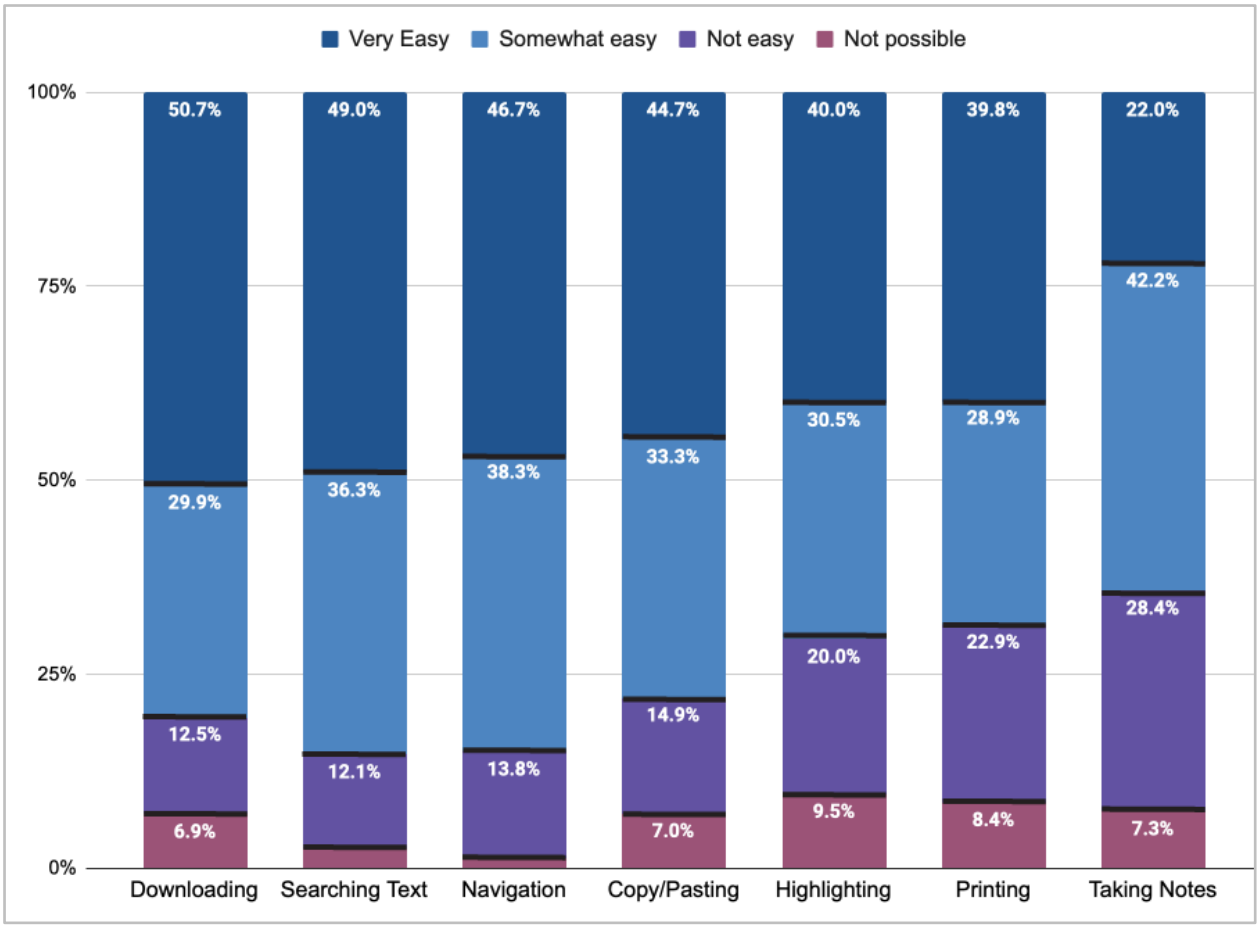
DEVICES	Responses	Percent
Laptop	154	89.5
Desktop Computer	49	28.5
Tablet	27	15.7
Phone	22	12.8

We were not surprised the majority of students used laptops and desktop computers to read their eTextbooks. Given the nature of the eTextbook format, larger screens make sense. Students did read on mobile devices, however, meaning that vendors need to be aware of and plan for responsive design and mobile-friendly eTextbooks when making decisions about their products.

Ease of Use

One key focus of the 2011 and 2012 surveys was learning about students' perceptions regarding how easy or difficult it was for them to use library-provided ebooks as eTextbooks. This survey sought to follow up on those investigations by asking students, "please rate the ease of use for the following eTextbook features…" Features included Navigation, Printing, Copying and Pasting, Highlighting, Taking Notes, Searching within Text, and Downloading. Response options included Very Easy, Somewhat Easy, Not Easy, and Not Possible. Results are shown in Fig. I.

FIGURE I
RESPONDENT RATINGS OF ETEXTBOOK EASE OF USE



Looking at these results, it is important to consider that in response to this question, students were reporting their personal experiences with the eTextbooks. The librarians were specifically interested in the experiences of students reporting things not being possible. As an example, we were able to analyze the data to discover that five students reported not being able to highlight or take notes in books from the vendor ScienceDirect. While we trust students' perception that they are unable to highlight or take notes, in reality, highlighting and taking notes in ScienceDirect ebooks is possible. The method varies depending on whether a student reads the book online, downloads the PDF, and which software is used to read that downloaded PDF. These results point to a need for better instruction around the use of eTextbooks, as discussed below in the Future Work section.

Problems with eTextbooks

Students were asked whether they had experienced any problems when using the eTextbooks. Twenty-nine students, or 16.9 percent, of the 171 who responded to this question stated that they

had experienced problems with the books. Students described the problems they had with the eTextbooks in an open comment form. From this information, reported problems were coded and sorted into major themes, which included:

- Searching / Navigation problems - 33%
- Technical Issues, such as loading, refreshing, auto logout - 33%
- Downloading / PDF problems - 27%

Of the 29 responses, librarians identified four that were representative of students' feelings:

- Hard to find a specific topic based on the way the chapters were organized on the website.
- The book is on the website as individual chapters instead of the full textbook, which makes it difficult to search.
- Searching works but highlights a few characters after the searched phrase, also it's annoying to download chapter by chapter.
- Cannot download the full book or even a chapter at once. I can only download a short section at one time, which is annoying and I just give up downloading it.

A final quantitative survey question asked, "Would you use free university-provided copies of eTextbooks in the future?" More than 92 percent of students responded "yes" to this question and the remainder responded "maybe." Zero students responded "no."

Finally, 48 students responded to the open question, "Do you have any other comments about eTextbooks?" Of these 48 comments, librarians identified four that were indicative of the overall results. Those responses included:

- Most professors will not allow you to use eTextbooks on an exam so it would be problematic in this case.
- When they are free, they are a great option for students with financial limitations. I wish more textbooks were eTextbooks.
- I like them, but for me it's hard to do highlighting or bookmarking. Equations can sometimes be messed up in certain formats too. So a hard copy available would also be nice.
- Having the orbital mechanics textbook available free and online this semester has been great. It's simply not feasible to carry multiple textbooks around, and not having it on-line would inhibit my ability to do homework problems from it and other textbooks while on campus.

Focus Group Results

Focus group students were engaged and happily willing to discuss eTextbooks and the library. We asked a series of eight questions (Appendix B) and allowed for tangents in the discussion as necessary.

eTextbook Problems

Our most fruitful question was about problems the students ran into while using eTextbooks. These responses mirrored our survey responses about eTextbook problems, but we were able to learn more details. Students do not like when they are forced to create a username and password before downloading a book. Although most of our vendors do not require this, some require it before a student can even see the eTextbook, and some require it to gain access to a higher allotment of pages for downloading or printing. One of our students used an eTextbook that allowed note-taking only if the user had a touchscreen laptop, which she did not.

Some of our eTextbooks (mostly on aggregator platforms such as ProQuest EBook Central) allow a student to download an entire book, but only for a period of three days; the book has to be renewed every three days or the PDF will no longer be accessible. The downloadable book also needs third-party software in order to function, and requires the student to create an account with a login and password. One of the focus group students said these features were so cumbersome that she stopped using the textbook for her class. Not all books on EBook Central have the same restrictions (it is dependent on individual publishers), but those with Digital Rights Management (DRM) are the most restrictive.

Other limitations on aggregator platforms include a restriction on the number of pages available for download and/or printing. One book available to students as an eTextbook, *Essential Physics of Medical Imaging*, is 1031 pages long. When students first view the eTextbook, only 315 pages are available for download or print. If the student creates an account with a username and password at the aggregator site, then 420 pages become available for download or print. There is no information about this increase in allotment on the book's webpage, so students are unaware of this minor workaround. Regardless of whether the user creates an account and logs in, the page allotment is not enough for meaningful engagement with the text, and students in our focus groups strongly preferred a downloadable option over the option of reading directly on the web platform.

Another problem students encountered with eTextbooks was their inability to search when the book pages were scanned in as images instead of available as smart PDFs. If the page is an image, the control-F function will not work.

Format Preference

Our focus group students were evenly split between preferring print books and eTextbooks. Those who preferred print identified the ability to skim rapidly and flip between multiple places in the book as key to their preference. Less eye strain and the familiarity of print books was also important. For those students who preferred eTextbooks, portability, searchable PDFs, a clickable Table of Contents, and a navigation pane were identified as important factors.

Textbook Costs

We were interested in whether textbook costs (whether print or electronic) impacted students' decisions about whether to enroll in classes. Students said that it might be a factor when enrolling in an elective, but never in a required class. Most students we asked did not actually check for textbook cost before enrollment. During this discussion, students shared with us that about 85 percent of their required textbooks could be found either online or from friends. The exact percentage and quality of the eTextbook varies based on whether or not the book is for an established undergraduate course, or a very specific graduate course in a niche subject. At our university, students use a student-run Facebook page for their department to hold a "PDF Open Trade" period at the beginning of each semester.

Students were asked about renting a textbook versus purchasing, and the majority said they would definitely rent the book because renting is less expensive. Often students consult course reviews online and fellow students that have taken the class before to see if they need a textbook at all.

Vendors

One of our vendors, SpringerLink, provides a print-on-demand version of their ebooks for $25. This price is significantly less than the bookstore price, and when we promote the available eTextbooks to students, we always mention this particular SpringerLink option. However, none of our focus group participants were familiar with it, and none would take advantage of it even though they now know it exists.

We asked if any of the students had a preference for any ebook vendors, and they did not. They had very strong feelings for features like downloadable PDFs, and did not associate those features with vendors.

Feedback

Finally, we asked for any other feedback from students about print textbooks, eTextbooks, or the library in general. All of them expressed gratitude for library services and especially for providing and promoting eTextbooks for engineering classes. Some of them didn't like that textbooks were required for classes at all, or suggested that textbooks should be provided for free, given the cost of tuition. Several of the students were unhappy that some of their textbooks were written by their professors. One of the students mentioned that there were definitely more eTextbooks available now than there were four years ago, and he was thrilled with that. One of the students was in the healthcare engineering field, which had a very small number of eTextbooks.

Comparison with Previous Study

We reported in 2013 [5] on surveys done at AAEL in 2011 and 2012 on student experiences with eTextbooks. While the survey instruments, user populations, and ebooks have changed in the ensuing years and it is impossible to make direct comparisons, we found it instructive to look back at data from the earlier surveys in light of these more recent results.

Both surveys returned some similar results from the open comments:

- The practice of flipping through pages, as one can do with a print book, is not replicated in any form with ebooks.
- There is a strong preference among students for ebooks to be in the format of one, downloadable PDF file.
- As a student from 2011 reported, "All electronic textbooks have the inherent problem of preventing the readers from forming spatial memory about the text, which is a positive aspect of physical books." We saw this sentiment echoed in both our focus groups and survey responses, in response to our question about why students preferred a print book.
- Highlighting and note-taking is still important. One student reported in 2012: "Highlighting and taking notes on electronic books has always been an issue when compared to textbooks" and students in 2019 commented: "With some upper level classes it's easier to have [books] in print for annotating and highlighting" and "It's hard to do highlighting or bookmarking."
- Using ebooks in an open-book exam setting is still an issue. From a 2011 student: "We cannot have electronic devices [in our exams], eliminating the possibility of using an ebook."And in 2019 students reported similar issues: "Some classes (this one included) don't allow ebooks for exams" and "most professors will not allow you to use

> eTextbooks on an exam" and "we were told that an ebook was not acceptable for the exam so we all had to have a print copy or print the relevant book portions."

While there were many similarities in the open comments over the three surveys, there were some differences that we considered positive.

First, no respondents to the 2019 survey used the open comments to discuss legibility issues of the eTextbooks. In both 2011 and 2012, many students wrote about image resolution, blurry images, and illegible words. This suggests that the quality of eTextbooks, at least in terms of legibility, has improved in the intervening years.

Secondly, a majority of respondents to the 2019 survey, 85.4 percent, reported having learned about the eTextbook on or before the first day of class. Some students who responded to the 2011 and 2012 surveys stated that earlier notification of eTextbook availability would have been useful to them.

Lastly, compared with 2011 and 2012, more digital content is available to our students. In Fall 2019, we were able to offer students 93 ebooks, which represented 44 percent of the number of titles that had been requested by engineering faculty. In Fall 2012, we offered 71 ebooks, which represented just 18 percent of the number of titles that had been requested.

Conclusion

For the last ten years, the AAEL has sought to provide engineering students with greater access to their course textbooks by adding to its collection electronic copies of textbooks whenever possible. In this way, the library can offer students a cost-free alternative to purchasing an expensive textbook. This study was undertaken to learn from students their perceptions of the textbook collection strategy as regards the utility of the eTextbook options.

Our study results show that students are interested in eTextbooks. As one student stated in the survey, and as was echoed by others in the survey and the focus groups, "I love to use them when they are free and provided by the university!" Even though 35 percent of students state that they prefer print books to ebooks, students will use the eTextbooks when they are free. Students in the focus groups also mentioned that they will work with a previous edition of the book when the older eTextbook is in the library collection but the current edition is not.

Students are resourceful, and in the focus groups they talked about how they can find 85 percent of their textbooks for free online. We hope that publishers will take note, and decide that it is in

their interest to provide access to eTextbooks through academic libraries at reasonable prices and without restrictions such as downloading, checkout periods, or user limits.

Though neither the survey nor focus group responses allowed us to draw any conclusions regarding best vendor platforms, students did indicate some clear preferences: The best format for them is a downloadable PDF file; highlighting and taking notes are important functions to include; and students would be aided by functionality that replicated the flipping between pages that one can do with a print book. Students in the 2019 survey and focus groups reported fewer technical problems with the eTextbooks than students reported in 2011 or 2012. This same information has come to us anecdotally, shared by our colleagues who support library reference services; we conclude that this is largely due to increased access to more eTextbooks with no simultaneous user limits.

Students also appreciated the library's efforts in providing and promoting the eTextbook service. As was apparent from both survey and focus group results, students would like for the library to continue publishing eTextbook lists on its website and continue sharing information about eTextbook availability with faculty.

Future Work

Although the AAEL is committed to offering eTextbook options for engineering students on our campus, we recognize that further work is needed in this area. First, for an engineering program that lists 674 lecture classes, we were aware of textbooks for only a relatively small number of classes. To have a clearer picture of what materials faculty are using, we will need to reach out directly to faculty to learn what educational resources students need so that we can make more resources available. This discussion with faculty can also include discussion about including an eTextbook option on their open book exams.

We are further constrained by the number of existing textbooks made available in electronic format on institutional licenses. Where and when appropriate, we have begun to advise faculty about alternate titles that are available as ebooks or Open Educational Resources that they might consider using for their classes.

We plan to continue providing feedback directly to publishers and aggregators about ebook features that students find useful. To this end, we have already met with the ScienceDirect ebook project management team and shared with them relevant findings from our survey and focus groups. Baek and Monaghan [15] tell us, "…there is a long way to go to meet students' expectations…price alone cannot be the driving impetus for…successful eTextbook

implementation" [15]. As publishers and aggregators continue improving on their products, we expect that students' use of and satisfaction with eTextbooks will increase.

Finally, outreach and education around ebooks can improve. Consider again how in our survey's question on ease of use, at least some students told us that each of the following—navigation, printing, downloading, copying and pasting, highlighting, and taking notes—were not possible with the eTextbooks that they were using for their classes, even though that may have been incorrect. We as librarians must do a better job of educating students on the functionality of their eTextbooks so that they can use them to their greatest advantage.

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Appendix A
Survey Questions

The Library is conducting a study to learn about student preferences regarding textbook formats, with a focus on electronic textbooks. This survey will take 10 minutes or less. The survey does not ask sensitive questions, and we will be reporting aggregated data (i.e., your data will not be identifiable). At the end of the survey, you can enter a drawing for one of eight $40 Visa gift cards. (When entering, your identity will be logged separately from your survey responses.)

Please email the librarians with questions or comments about this survey. Thank you for your participation.

If you wish to continue, please click 'Next' below.

Many textbooks come in both **print** and **eTextbook** formats.

eTextbooks are digital versions viewable on a device such as a computer, tablet, or phone (does not include readings posted on Canvas).

Print textbooks are physical books with paper pages.

If one of your course textbooks was available in both formats, which would you prefer?

- ○ The print textbook
- ○ The eTextbook
- ○ Both equally
- ○ I do not use textbooks

Do you have any disabilities that affect reading or how you interact with text and/or printed material?

- ○ Yes
- ○ No
- ○ I prefer not to answer

What do you like about **print textbooks**? (please select all that apply)

- ☐ Like to write in book/highlight
- ☐ Like to read on paper
- ☐ Easy to navigate in a print book
- ☐ Want to keep and use my print books in the long term
- ☐ Print books are compatible with my print disability
- ☐ Other things you like (write in here)

What do you like about **eTextbooks**? (please select all that apply)

- ☐ Like the portability of eTextbooks
- ☐ Can make notes/highlight in eTextbooks
- ☐ Like to read on a screen
- ☐ Easy to navigate in an eTextbook
- ☐ eTextbooks are compatible with my print disability
- ☐ Other things you like (write in here)

Why don't you use textbooks? _____

Are you in the following class this semester? [course number and name]

- ○ Yes
- ○ No

Your textbook for that course, titled [book title], is available as an eTextbook, **free from the University.**

Which is true of you?

- ○ I knew there was an eTextbook version, and **knew it was free**
- ○ I knew there was an eTextbook version, but **didn't know it was free**
- ○ I didn't know there was an eTextbook version

How did you learn about the free, university-provided copy of this eTextbook, [book title]? Please choose all that apply.

- ☐ Announcement from instructor
- ☐ Course syllabus
- ☐ Information on a library webpage
- ☐ Searched in the library catalog
- ☐ Fellow students
- ☐ Learned about eTextbook in another way (write in here) _____

When did you learn about the free, university-provided copy of this eTextbook [book title]?

- ○ Before the start of the class
- ○ The first day of class
- ○ After class started

Have you used [book title] as an eTextbook?

- ○ Yes
- ○ No

Have you used [book title] as a physical print book?

- ○ Yes
- ○ No

What are all the ways you have accessed [book title]? (please select all that apply)

- ☐ Print book - purchased or rented
- ☐ Print book - borrowed from peer
- ☐ Print book - borrowed from the library
- ☐ eTextbook - purchased or rented
- ☐ eTextbook - free from University
- ☐ eTextbook - other online source
- ☐ Accessed book in way not listed above (please describe) _____

When you used [book title] as an eTextbook, what devices did you read it on? (please select all that apply)

- ☐ Desktop
- ☐ Laptop
- ☐ Tablet
- ☐ Phone
- ☐ Other device (please describe) _____

Have you used [book title] as an eTextbook during an exam or test?

- ○ Yes
- ○ No

You indicated that you've used both a print and eTextbook version of [book title] Which version do you use more?

- ○ Print
- ○ eTextbook
- ○ Use both equally

Please rate the ease of use for the following eTextbook features for [book title]:

	Very Easy	Somewhat Easy	Not Easy	Not possible	No basis for judgment
Navigation (ToC, chapters)	○	○	○	○	○
Printing	○	○	○	○	○
Copying and pasting	○	○	○	○	○
Highlighting	○	○	○	○	○
Taking notes	○	○	○	○	○
Searching within text	○	○	○	○	○
Downloading	○	○	○	○	○

Have you ever experienced any problems when using [book title] as an eTextbook?

○ Yes

○ No

What were the problems you experienced? _____

Please check 'somewhat agree' below.
(The purpose of this question is to ensure that people are reading the questions. Thanks!)

○ Strongly disagree

○ Somewhat disagree

○ Neutral

○ Somewhat agree

○ Strongly agree

Would you use free university-provided copies of eTextbooks in the future?

- ○ Yes
- ○ Maybe
- ○ No

Why wouldn't you use free, university-provided copies of eTextbooks in the future? _____

Do you have any other comments about eTextbooks?_____

Would you be willing to meet and answer further questions about eTextbooks with a group of other students?
(The group meeting will be organized by the librarians who are sending this survey.)

- ○ Yes
- ○ No

Thanks! Please provide your email address so we can follow up with you about the focus group.

Appendix B
Focus Group Questions

1 – QUESTION: How many of you knew you had a liaison librarian for your department? How did you find out about them?

2 – QUESTION: What problems have you had with eTextbooks?
-downloading? (found any workarounds?)
-authentication via email?
-highlighting/taking notes?
-formatting (of formulas, diagrams, figures, etc.)?

3 – QUESTION: Do you prefer eTextbooks or print textbooks and why?

4 – QUESTION: Does print textbook cost and/or eTextbook availability impact whether or not you take a class?

5 – QUESTION: Does cost impact your decision to purchase versus rent a textbook? What other factors affect your decision?

6 – QUESTION: One eTextbook vendor, Springer, allows you to buy an on-demand, print version of the textbook for $25. Have you bought one from Springer? Why or why not? Have any of you bought an on-demand, cheaper textbook version through Springer?

7 – QUESTION: Which vendors / platforms do you prefer? Why? ie Springer, Safari, Cambridge Core?

8 – QUESTION: Any other feedback around textbooks, eTextbooks, or the library?