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Cost per Use as an Electronic Resources Evaluation Parameter: Can You Use It Under Extraordinary Circumstances?

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Abstract

In 2017, the University of Puerto Rico (UPR) suffered two extraordinary events that substantially affected library services. From March through June 2017 the university was closed due to a student strike that affected daily activities and academic services. In September of the same year, our country was hit by the most powerful hurricane ever recorded in its history, which left the whole island without power and communications infrastructure for many months. In both scenarios, access to electronic resources was seriously affected.

Usage reports are important for, among other things, evidencing the use of electronic resources in a certain collection, justifying the allocation of funds, and as criteria for evaluating resources. Cost per use is one of the evaluation parameters used by many academic institutions, including the Library System at the UPR Rio Piedras Campus (UPRRP). However, what happens when there are extraordinary factors that affect the calculation of the cost per use during a period of time? What alternatives exist, if any, to be able to calculate and continue using cost per use as a reliable evaluation parameter?

This work in progress proposes the development of a new way of calculating and analyzing the cost per use of the electronic subscriptions of the UPRRP Library System using data that is not influenced by extraordinary events and that may affect the final result. The use of the median instead of the average to calculate the cost per use can be an effective alternative to deal with this problem.

The Library System at the University of Puerto Rico, Rio Piedras Campus

The Library System of UPRRP consists of 21 different libraries and collections that provide services to nine faculties and graduate schools. It serves a population of nearly 14,000 students, 1,300 faculty members and researchers, and 1,600 nonfaculty staff. Even though each library and collection has their own staff and coordinates their services to the public, the Library System handles all tasks regarding administration, budget management, cataloging, acquisitions, preservation, and information systems and technologies management. Due to its status as a public institution, the UPRRP, as well as the other 10 campuses of the University of Puerto Rico, receives the general public and offers them access to information resources, the Internet, and many other services that can be compared to those offered in a public library. There are not enough public libraries in the country, so we daily welcome hundreds of patrons from the nearby communities of Río Piedras and San Juan with different economic, social, and academic backgrounds.

The electronic resources collection of the Library System (LS) consists of 134 databases in 59 different

platforms or interfaces that cover all the disciplines offered at the UPRRP. It has around 8,000 electronic books and 7,550 individual journal titles. Of these, 1,231 e-books and 1,400 journals are not part of any collection or bundle and are single selected and acquired with perpetual rights for the institution. The LS also subscribes to ProQuest Summon and EBSCO Full Text Finder discovery services.

Cost per Use at UPRRP and the Year 2017

We couldn't find in the literature a standard definition of cost per use, only brief instructions on how to calculate it. However, for the purpose of this research I ventured to define it as a quantitative parameter that describes the result of involving the amount of funds invested in a particular resource and the amount of activity related to it. You may calculate cost per use by dividing the cost of the electronic resource (e-journal, database, etc.) you are evaluating by its usage during a particular period of time. Usage may be the number of downloads, searches, clicks, full text requests, or any other parameter that your library finds useful to measure. Among its uses and benefits are:

- Offers important financial information that may be of use in the preparation and redaction of budget proposals and justifications.
- Provides useful information that may be helpful when negotiating with vendors.
- Facilitates evaluation and comparison between other electronic resources and subscription models.
- Serves as a parameter to calculate the return on investment of electronic resources.
- Presents a view of how reasonable the financial investment in a particular resource has been and may help to answer questions such as: Are we paying a fair price for an electronic product? Does the use justify the cost? Have the amount of funds invested in a resource been ethical or even moral?

Nevertheless, as expressed by Harrington and Stovall (2011), “cost per use is in no way the end of the serials’ decision process, nor is it a replacement for the qualitative expertise of trained librarians . . . it is a time-saver rather than a decision-maker.” In other words, cost per use is just a part of the evaluation process, and it shouldn’t be the only parameter used for this purpose. Other steps and analyses that involve additional quantitative and qualitative data must be included in the evaluation process.

At UPRRP, we use cost per use as an important measure to evaluate single subscription titles that are up for renewal. Twice a year, we gather the usage reports for these journals for the past 12 months and compared them with the figures from the year before. This exercise provides us with a view of each title’s behavior regarding its relevance, visibility, popularity, and importance among our users during the evaluated period. Those titles with sudden changes in their pattern, such as significant increases or decreases in usage and cost per use, are selected for further assessment. Calculation of cost per use is based on the total cost of the resource during a specific timeframe and the total number of full text requests for the same time, which will give us the average cost per use for the determined period. The number of full text requests is obtained from the COUNTER4 JR1 usage reports provided by the publisher.

COUNTER reports provide data regarding downloads, views, denials, sessions, clicks, and other

actions related to the usage of electronic information resources. It also provides standardization since all publishers and providers that adheres to the Project COUNTER Code of Practice must follow a set of strict guidelines to create and present their usage reports to clients. Those guidelines present definitions for each action to be counted, establish a unique format for each report, and offer quality guarantees since all data presented may be subject to audit. For more information regarding Project COUNTER you may visit <https://www.projectcounter.org/>.

The selected titles then move on to a broader evaluation process that includes another set of quantitative and qualitative criteria that help librarians in charge to make recommendations to the Acquisitions Section and the Library System about the future of the subscription. It can either be cancelled, renewed, monitored, or reevaluated in the next evaluation period. Usually when we renew a title with a cost per use higher than the limits we established, a set of activities are designed to improve its usage, visibility, and interest from users.

This method has worked for us pretty well for the past three years and runs smoothly without any major struggles or complications during ordinary periods, apart from the creation of forms, tables, and graphics, which can be challenging if your library doesn’t have access to an ERM or can’t afford to subscribe to a commercial usage analysis tool, which is our case. However, what happens when your institution suffers an unusual event during the year that may dramatically affect the usage pattern for electronic resources? What if your evaluation period changes from ordinary to extraordinary?

In 2017 we suffered not one but two extraordinary events that dramatically affected the credibility of usage reports for electronic resources, not because there was any alteration in the numbers they presented, but because access to electronic resource was affected, hence it should have consequences for usage reports. First, between March and June 2017, UPRRP was closed due to a student strike that practically suspended all major academic and administrative activities. There was no access to campus facilities, most classes couldn’t be offered, and none of the libraries and collections of the UPRRP were able to operate. Online access to electronic resources was never interrupted, but since academic activity was minimal, there was a significant reduction of demand to access online subscriptions. After the strike ended in June 2017, the academic

semester was extended, academic and administrative activities resumed, and usage of electronic resources started getting back to normal, reaching its peak during the summer months, which tend to be much slower during an ordinary year.

Then, on September 20, 2017, another extraordinary event happened. Hurricane María hit Puerto Rico, leaving every corner of the island without electricity. The communications infrastructure collapsed. There was no Internet or cellphone service and, for days, no way of communicating at all, locally and with the exterior. All academic activity was paralyzed and there was virtually no usage of electronic resources at all. After the electricity came back to campus in November, the UPRRP quickly resumed administrative and academic activities and the semester was again extended. Access to electronic resources was reestablished, but there was still a substantial amount of the population without power and/or Internet service, affecting remote access to online subscriptions for many months.

As expected, usage numbers took a hit and a gap was created between the events and the moment activities resumed. However, renewal notices for all subscriptions were received normally, and the evaluation process was needed as before in order to make decisions regarding their renewal. Librarians then started having doubts during the evaluations process and started asking questions like: How can we trust the same method we have followed in the past since usage patterns were broken? How reliable can a cost-per-use analysis be in a year when usage numbers were expected to substantially decrease? How can we make serious decisions regarding electronic subscriptions with altered data? These legitimate questions and concerns were shared with the Acquisitions Section, which is in charge of handling all electronic subscriptions. After carefully studying different options, a solution was presented.

The Median

The median is a numerical value that can be defined as “the middle score for a set of data that has been arranged in order of magnitude, in other words, 50% of the observations are smaller and 50% of the observations are larger” (Friedman, 2015). Its arithmetic formula is:

$$\text{Median} = \{(n + 1) \div 2\} \text{th value}$$

n = number of items calculated in set

In simpler terms, the median is the number located in the middle of a set of values after they have been organized in numerical order. For example, on a dataset when the total of values is an odd number, add 1 to the total of values and divide it by 2. The result will show the position of the median in the set after all values have been organized. On datasets when the total of values is an even number, using the same formula, the median will be located between two values, located in the middle. To get the exact median value, you need to add these two numbers and then divide the result by 2. In some cases the result may be a decimal number, in which case you will need to round it if you are using it with usage reports analysis.

Using the median instead of the more popular average or mean can be quite effective in dealing with outliers by introducing less distortion to a dataset. Therefore, extreme values are replaced with values more consistent with the rest of the data (Lamothe, 2014). In our specific scenario, the outliers may be defined by the number of full text requests caused by extraordinary events, which, at the same time, affected the total usage in 2017. This result might be substantially lower in comparison with the total usage of the previous ordinary year, showing a disruption in the usage pattern.

We couldn't find in the literature any example of a library that has tried using the median as a numerical value to calculate cost per use before. So, in order to test and possibly use this idea in our next annual evaluation process for electronic resources, we decided to design our own simple technique, which contemplates using the median instead of the average to calculate the cost per use. For this method, we need to gather information regarding the most recent price paid for the evaluated resource and the number of full text requests according to its respective annual COUNTER4 JR1 report. Unlike the average, which can be calculated using just two or more values, the median works better with larger samples. Having that in mind, we decided to gather usage data from the past five years, instead of two, as we used to do in our previous analysis. The next step is identifying the electronic resource's median usage for the selected five-year period, which in this case shouldn't be hard to find since we are working with just five values per title, one per year. Finally, divide the most recent price paid by the median usage, and the result will be the new “adjusted cost per use.”

$$\text{Current Cost} \div \text{Median Usage per Period} = \text{Adjusted Cost per Use}$$

It's important to know that ERM's and commercial usage analysis tools available for libraries use the average, instead of the median, to analyze usage behavior and generate cost per use information. Librarians and electronic resources managers are not able to alter this process. In order to be able to use the median to calculate cost per use and create usage analysis, you will need to create your own tables and spreadsheets. However, these calculations can be easily done automatically by using any popular spreadsheet and calculation software such as Microsoft Excel or Google Sheets.

Conclusion

The median is a numerical value located in the middle of a dataset after all values have been organized in numerical order. It is known for dealing better with outliers and extreme values in a sample. After suffering two extraordinary events

that affected access to electronic resources and confidence in usage analysis, a new method was proposed to calculate cost per use of single-title electronic subscriptions. After gathering usage data from five previous consecutive years and current pricing information, the suggested method contemplates using the median, instead of the average, to calculate cost per use. Several librarians and decision makers at the Library System of the UPRRP found this solution to be an appropriate alternative to help maintain the reliability of cost per use as an effective quantitative parameter in the evaluation process. The LS Acquisitions Section plans to fully test this technique for calculating cost per use, starting with the next evaluation of single-title subscriptions in 2019. This will allow us to identify its advantages and disadvantages, and evaluate the impact and repercussions on usage activity analysis caused by the 2017 extraordinary events. The results will be shared in a future publication.

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