

Design and Implementation of a Study Room Reservation System: Lessons from a Pilot Program Using Google Calendar

Shira Atkinson and Kirsten Lee

Collaborative work spaces within academic library settings are becoming increasingly important as libraries consider their roles in the twenty-first century. This paper considers the value of implementing a room reservation effort as part of the larger drive toward creating viable collaborative work spaces and discusses how to effectively manage a room reservation system. This paper presents a pilot study of the effectiveness of Google Calendar appointment slots as a room reservation system in a library setting at Fordham University, a major university in New York City. In a one-semester study, staff tracked usage trends among different user types and evaluated the efficiency of their selected room reservation system. Through this evaluation, staff determined that Google Calendars is technically equipped to provide a free but very basic room reservation system for academic libraries but that it requires considerably more upkeep and management by staff than more costly or open source options. Results of this study can be used to guide future decisions regarding room reservation policies and system requirements.

Introduction

Over time, libraries have experienced a shift from being spaces devoted to storing and organizing physical, informational materials to becoming spaces that encourage collaborative learning environments, often termed “learning commons.” Now that so many library holdings are accessible digitally, academic libraries have the opportunity to make use of their physical space in new and innovative ways. Instead of simply storing information materials, the library space can and should evolve to meet current academic needs by transforming into an environment that encourages collaborative work. Because collaborative work spaces are limited, it is essential that they are made available to as many students as possible. In particular, implementing a system to manage study rooms can prevent the hoarding tendencies exhibited by students within first-come, first-serve systems.

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These goals underscored Fordham University Library's decision to make new study rooms electronically reservable in the fall 2016 semester. This paper considers the role and significance of group study room spaces in academic libraries and the necessity of electronic reservation systems in the digital age, and it details the process of selecting a room reservation system, which involves looking at a myriad of factors including cost, administrative support, and staff monitoring. It also presents the process of selecting a system and its trial implementation, including the different ways that staff marketed and promoted the system.

Overall, information from the pilot study at Fordham reinforces trends seen at libraries in other academic institutions, such as student demand for online, automated library tools, as well as a strong desire to use the library space for collaborative work. This pilot study, which used Google Calendar as the room reservation system, shows how libraries everywhere can use tools and programs already at their disposal to fill roles for which they may not have been originally designed. In addition, the pilot program allowed Quinn Library staff to gather data about usage trends, which have guided the adaptation of the policies and procedures for an improved iteration of a room reservation system to best match student needs. These usage trends may not be the same across all university settings, but libraries that are considering implementing new programs, such as a room reservation system, should attempt to understand their students' needs and usage patterns to create a system that best serves them.

Ultimately, however, while this initial data captured indicates strong student support for a reservation system, it also demonstrates the deficiency of using Google Calendars as a room reservation system at academic libraries due to the considerable administrative burden it places upon staff. Today's academic libraries are often understaffed and underfunded, and it is unreasonable for many academic libraries to implement a room reservation that requires so much manual upkeep.¹ The problems with Google Calendar are indeed many of the same problems seen in analog (paper) systems, which impose a significant burden because they require staff to monitor and police the use of the study rooms and generate useful statistics manually. Staff time is valuable and finite, and, although the Google system performed functionally, the increasing importance and popularity of collaborative work spaces should encourage libraries to select room reservation systems that function automatically to enforce policies and procedures.

Background

Fordham University is a Jesuit institution in New York with campuses in the Bronx, Manhattan, and Westchester counties. Quinn staff at Lincoln Center (LC) operate semi-independently but often collaborate on larger projects with colleagues from the other Fordham campuses. The Manhattan LC campus serves a total of 7,858 undergraduate and graduate students, and the Quinn Library serves the entire undergraduate and continuing education population as well as graduate students pursuing degrees in education, social work, law and business.² All students, regardless of degree program, have equal access to all library resources; however, law students also have a separate law library that they principally use.

In the summer of 2016, Quinn Library moved approximately 25 percent of its print collection and all of its operations into a new building, which was designed with the priority of providing collaborative work spaces for students. Among the significant changes to the library design were the introduction of a first floor learning commons space as well as six private group study rooms on the third floor. In particular, the addition of these study rooms prompted Quinn staff to consider whether to implement a room reservation system for these spaces and, if so, to define the requirements of such a system.

First, to address the question of whether Quinn Library would benefit from implementing a room reservation system, LC Library staff spoke to their colleagues at Walsh Library from Fordham's Rose Hill Campus (RH) in the Bronx, which has seventeen private group study rooms but chose not to implement a reservation system because of staffing concerns. Instead, the rooms are open on a first-come, first-serve basis. As a result, staff have noticed that the rooms are used inefficiently and unequally and are a consistent source of student complaints. According to informal student interviews, rooms are misused in a variety of ways.³

Chiefly, a single student or a small number of students might monopolize a room for an entire day either because they want to have access to the room throughout the day or, more commonly, because they want access to the room at a particular time and therefore need to arrive much earlier so as to guarantee access. Students effectively take over study rooms both by staying in the rooms and also by leaving their personal belongings in the room to prevent other students from using the space. Consequently, study rooms at Walsh Library are almost always occupied by a very small subset of the student population, denying other students the opportunity to use these spaces. In consequence, some students avoid the library altogether because they do not expect to find the space they need for group work. Overall, students characterize the current system at RH as frustrating and inefficient. Furthermore, the inadequacy of this system has prompted individual students, as well as Fordham's United Student Government, to formally request the implementation of a group study room reservation system at RH.

Because of the inefficient use of study rooms at RH, and the premium on space in Manhattan (LC), the comparatively larger student population at LC than RH, and the vocal desire for a room reservation system by the United Student Government, the LC Library staff opted to implement a room reservation system starting in the fall 2016 semester.⁴ Quinn staff conceived of a system that would serve student needs, make efficient use of library resources and space, and function semiautomatically with relatively little staff monitoring.

To achieve these goals, they assembled a five-person Study Room Reservation Task Force that had members from both the LC and RH libraries and included circulation staff, reference librarians, and the Fordham Access Services Librarian. Members of the task force were selected by supervisors and chosen because of their technical abilities, because they expressed interest in the project and because they represented a diversity of professional backgrounds. This task force investigated different reservation softwares, drafted policy for group study room usage, selected and implemented the system, and monitored and enforced the system throughout the semester.

Literature Review

The necessity of a room reservation system was underscored by modern trends in library design, which are increasingly emphasizing collaborative work spaces to enable constructive interaction among students and between students and librarians and de-emphasizing outdated models of libraries as stagnant knowledge repositories.⁵ To facilitate increased collaboration and active knowledge creation, libraries are turning to the idea of a learning commons.⁶ The concept of an information or learning commons emerged alongside the introduction of the internet and the changes it introduced for learning and researching.⁷ It refers to a shared space that provides students the opportunity to work collaboratively and engage with noncore library functions. Whereas classic or core library functions refer to reference services, ordering books, subscribing to databases, and circulation, new trends in education emphasize cooperative learning and group learning. In other words, library spaces are evolving into active study and learning spaces that are designed for a variety of activities that "may or may

not include the use of library materials.”⁸ These trends require libraries to embrace and enable new ways of learning through facilitating social interaction and an easy exchange of knowledge.⁹

To support the learning commons, librarians must assume the responsibility to advocate for a library space that is conducive to communal work. Additionally, the design process should be undertaken with professional planners and architects and be completed with the understanding of the growing importance of communal working spaces to users and students.¹⁰

Also, in keeping with the forward-thinking trend of increased library digitization, room reservation systems should be available online and easily navigable via the main library homepage. Through making the resource available online, libraries can work to meet the expectations of students who assume that most library resources are available digitally and to match the overall positive digital trajectory of libraries and research.¹¹ Furthermore, no matter the reservation software, libraries must be flexible in their approach to digital platforms, because workflows and systems will change with the advent of new technology.¹² Libraries must periodically evaluate the software programs they have selected to ensure that they are providing the best possible services according to the technology and software that becomes newly available.

Choosing a System, Criteria

Determining criteria for the room reservation system should be an involved decision, guided by the specific needs of each library’s set of users. It is also helpful to look at examples provided by other room reservation system policies to better understand their capabilities as well as their limitations. For instance, the LC Room Reservation Task Force decided on a set of policies that were determined by the needs that Fordham students expressed, policies that other academic libraries had adopted in their room reservation systems, such as limiting reservations by user type and by number of hours per week, and observations of student usage patterns by members of the task force, each of whom worked with students in different capacities and were therefore able to offer different perspectives on student behavior.¹³ In addition to serving the student population effectively, as with many academic libraries, cost and time were two primary concerns, and the task force attempted to find an option that was cost effective and easy to use, as well as simple to implement and manage.

In addition to time and cost, another primary consideration for the room reservation system was student privacy. In addition to ethical concerns, Quinn Library falls under the mandate of Fordham University to protect all personally identifiable student information, such as student ID numbers and contact information. Most university libraries will encounter similar restrictions and should be careful while using external systems that may expose or jeopardize student data.

At Fordham, the task force identified the following characteristics as being of primary importance: cost, time, and student privacy. However, in addition, Fordham’s ideal reservation system would be able to automatically regulate reservations by accepting only current Fordham students, limiting reservable hours by day and by week, blocking students who are policy violators, and updating students about upcoming reservations through email and SMS (text).

These criteria may vary among different libraries, of course, but should provide a sense of some of the basic considerations regarding room reservation systems. This tiered approach enabled the task force to prioritize their primary concerns while still working toward the ideal system.

Indeed, it is important for all libraries to be able to delineate primary and secondary concerns to choose the system that is best suited to address those priorities.

Room Reservation System Options

There are a multitude of options for room reservation systems. The options listed in this paper are by no means comprehensive, but they do provide a good range of options that exist in terms of cost and capabilities. It is also important to note that new options appear with some regularity. Investigate whether there is an existing institutionally sanctioned reservation system. If such a system exists, you will have the opportunity to discuss the system with other people and departments at your institution who would be able to share their experiences and recommendations. In addition, other academic libraries, especially ones that serve similar student populations, can be rich sources of information. Finally, when considering room reservation systems, libraries should always keep in mind the primary criteria that they want to implement to ensure that the system is capable of enacting these requirements.

The LC Room Reservation Task Force considered a number of different software options based on recommendations from other groups at Fordham University, programs used by other academic libraries, and the unique criteria that Quinn staff wanted to implement. While Fordham University does offer a universitywide event space reservation system, 25Live, staff did not consider it to be a feasible option due to the lengthy time frame for a confirmation, the lack of student accessibility, and the inability for library staff to manage or see reservations.¹⁴ Instead, the following options were considered:

Google Calendars

Cost: \$0/month

Google Calendar is a free app included with the Gmail/Google platform that staff and students at many universities, including Fordham University, use already.¹⁵ However, Google Calendars may be a less attractive options for university libraries that do not already run on a Google platform. Within Google Calendar appointment slots, it is easy to set customizable reservation times. To use it, students have to be signed into a Google email address (at Fordham, this includes all email addresses with the @fordham.edu domain), which would easily allow staff to identify unique users, while providing contact information for staff to inform the students about reservation violations, university closings, reservation reminders, or other information. Additionally, by using a system that identifies unique users through an email address, libraries can avoid jeopardizing student privacy that may come from linking to the university-held student profile that contains sensitive information about a student such as their student ID, telephone number, and more. Among its drawbacks, however, Google Calendar is unable to regulate reservations automatically, so staff must monitor the system to ensure that students only book the permitted number of hours and that they use a university email rather than a personal email account. Statistics and reporting are also not automated by the system.

*Online Web Software via Peoria Design Web*¹⁶ (used by Maloney Law Library of Fordham University)

Cost: \$1000–\$1200/year (based on number of users and reservable rooms, and level of technical support)

This small company designs a reservation platform according to personalized system requirements. While it is currently difficult to find information about this company online, it came to the attention of the room reservation system because the Maloney Library for the School of Law at Fordham University has used it for several years, and staff at the Maloney Law Library are highly enthusiastic about the system, praising its responsiveness, communication, and simplicity. Additionally, Online Web Software

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has not raised the price of its product in the four years the Maloney Library has used it. This room reservation system works by linking to a database of student records through an LDAP connection, which is a common internet protocol that connects two servers. The Fordham Law School's glowing review made Online Web Software a desirable option; however, the potential cost, as well as its need to be linked to potentially sensitive student information, such as phone numbers, student ID numbers, or personal addresses, may prove to be a drawback for some institutions, as it was for LC.

Booked Scheduler¹⁷

Cost: \$10/month

Booked Scheduler is an open source software that is highly customizable and includes built-in controls to ensure automatization. The price, which includes tech help via email, is very affordable, and overall this software is a highly economical option that still allows library staff to input a set of automatically enforced limitations. Similar to Online Web Software, Booked Scheduler would also load user records directly from Banner, the universitywide student information management system, which contains a large amount of personally identifiable student information via an LDAP plug-in. This connection could hypothetically expose student information.

My WC Online¹⁸ (used by the Fordham Writing Center)

Cost: \$715/year or \$65/month

This highly customizable system has been used by Fordham's Writing Centers at both the LC and RH campuses for more than five years. The system provides a platform for the student to voluntarily provide information about their program, school, and year for reporting purposes but does not link to any Fordham-based system (Banner) to verify this information. Unlike most reservation systems, My WC Online provides the option to set text reminders. Another useful and unique option it provides is a waiting list for when there is no immediate room availability. Like both Online Web Software and Book Scheduler, this system is also programmed to automatically generate reports and statistics. Unfortunately, it has a number of drawbacks as well. Students may use any email to reserve a slot, resulting in duplication problems as students can have multiple email addresses. Additionally, editing calendars is apparently cumbersome to the point at which the staff member in charge of scheduling often deletes and recreates calendars rather than editing them. Finally, because it does not automatically link with student records, this system can neither limit by type of user group nor collect information about user types (alumni, staff, students, or faculty).

Selection of Google Calendar

The Task Force ultimately decided upon the Google Calendar (appointment slots) system because it is quick, easy, and free to implement, and because it does not need to connect to student records thereby alleviating concerns about student privacy. Google Calendar is a tool used by many libraries for a variety of purposes. Since the release of the Google Calendar App in April 2006, libraries have used this resource to manage staff schedules and library hours; however, the task force was unable to find an example of a library using Google Calendar as a reservation system.¹⁹ However, Google Calendar has been implemented by libraries as a cost-saving measure in a variety of other contexts, including as a way to generate email reminders for fees for electronic resources, as well as to embed hours on a library website.²⁰ Also, in a comparison of Google Calendar to other online calendar systems, including Yahoo! Calendar, Windows Live Calendar, and 30 Boxes, based on various criteria regarding ease of use, a study shows Google Calendar to be the best and easiest to use in all evaluated categories,

including adding events, extending invitations, sharing, notifying, importing/exporting, syncing, and embedding.²¹

As previously stated, Fordham University uses a Google platform, having migrated to a Google email system in August 2010, which provides all students, staff, and faculty access to Google Calendar. Since then, Quinn Library has used the Google Calendar App to manage various staffing schedules, including personal appointments, instruction sessions, and student worker schedules. Staff and student's innate familiarity with the Google platform was highly beneficial. Not only were these users already proficient in Google Apps, but also the fact that Google Calendars is linked with a unique Fordham email address made it simpler for staff to verify a user's Fordham affiliation.

The Implementation

To set up a Google Calendar, the task force created a corporate, nonpersonal email address where information about the room reservations was held and where students could direct their room reservation questions. The password for this account was shared among all task force members. Then the task force set up separate calendars for each room size (small, medium, and large) with individual appointment slots within them. Each of these appointment slots was labeled with the size of the room, the room number, and the number of students allowed to use this room. The task force then set the appointment slot duration (one hour) and the hours at which they were available (staffed library hours). These parameters are all editable after the fact, and staff had the ability to manually change hours for holiday breaks and other days with schedule variations. Then the task force posted the public link, which is autogenerated by Google, prominently on the library website so students could begin reserving rooms.

In addition to creating an email account and the setup steps through Google Calendar, creating the system also involved writing policy statement email templates that the task force could send to students who violated room reservation policies (see appendix A). In total, setup time was approximately one week. However, the majority of that time was waiting for institutional approval of the corporate email account. After that, it took less than one day to complete the other tasks. When implementing new systems, libraries should expect a delay while the larger institution reviews and approves the system. Using Google Calendars shortened this time frame because it was designed to be completely run and managed by library staff and did not collect any student information. However, this process might take longer for other systems that do link to student data and require more oversight from university technological services.

Marketing and Use of QR Codes

Marketing is an essential part of implementing new programs and systems; and promoting a room reservation system effectively will ensure that, at a minimum, students know that the study rooms exist, know how to reserve them, and are able to easily locate all of the policies involving study room use. To help ensure the success of new systems, staff must be proactive in marketing the rooms in a variety of ways, both analog and digital.

For instance, at LC staff used Quick Response (QR) codes on signage that was posted directly on the study room doors. QR codes are freely available barcodes that contain information, often URLs that direct the user to relevant sites and sources. To use them, a student would first have to download a QR reading app on their smartphone and scan the barcode. At LC, these QR codes direct students to the online room reservation webpage, which includes the booking calendar as well as the list of room reservation policies. The task force opted not to post a printout of the room reservation schedule

on the door because reservations are made—and canceled—continuously. Instead, QR codes led students directly to the up-to-date booking schedule.

A QR code is a simple technology that has been integrated into academic library systems in multiple ways by linking students to the library homepage, blogs, social media accounts, and group study rooms.²² Within academic library settings, students have found it easy to use QR codes and demonstrate interest in using QR codes to accomplish important tasks.²³ To use QR codes effectively in an academic library setting, Ramon Alberto Rodríguez and Manuel Rivero (2016) recommend posting QR codes that are based on real student needs, presented within aesthetically pleasing posters/print materials and evaluated periodically to ensure that they continue to be an effective marketing tool for library resource and continue to meet real, current student needs.²⁴ QR codes allow students to directly access the room reservation booking page rather than going through the library website, which would require significantly more clicks and which could constitute a significant barrier to access.²⁵

Although there are many potential applications for QR codes, overusing QR codes can lessen their impact. Additional concerns may include the facts that not all students have smartphones to access QR codes, students may not want to download an additional app, and they may not innately understand what a QR code is and how to use it.²⁶

Therefore, in addition to QR codes, staff should continue to market the reservable study rooms in a variety of other ways by displaying the link on the library homepage, speaking about them during library orientations and instruction sessions, and posting signage at library services desks to advertise the new resource. Staff at Quinn worked with the library's social media team to promote information about the group study room reservation system through Facebook and Twitter. By relying on a variety of methods to market the study rooms, library staff can work toward reaching as many interested students as possible.

Monitoring the System and Enforcing Policies

Implementing Google Calendar appointment slots for room reservations does require staff to manually monitor and enforce the reservation system. To manage these tasks, staff set automatic notifications from the Google Calendar App so that the corporate email account associated with the room reservation system would receive an email whenever students signed up, canceled, or modified their reservations. The ideal policies, as outlined in appendix A, were created before the task force selected a room reservation system. Once they selected Google Calendars, the task force realized that they would not be able to completely enforce all of the policies; however, they kept the policies intact for potential future versions of the reservation system. Since all policing had to be done manually by a very limited number of people, the task force chose to enforce only the two most important policies: reserving with a Fordham email address; and limiting to two reserved hours per person each day. In libraries with smaller student populations, more study rooms, and/or fewer guests, staff may decide to enforce a different set of criteria.

At Fordham, however, the day-to-day monitoring of the system involved looking at the email notifications one by one to ensure that reservations were created with a fordham.edu email address and did not exceed two hours per day. If a user was in violation of either of the two policies, a task force member sent them an email explaining which reserved hours were in violation and why and provided the corporate email address in case they had further questions. Then, library staff deleted any reservations that were in violation of the policies. The task force divided up the work by assigning each member a different day of the week to monitor. The ongoing task of maintaining the system varied tremendously depending on the day of week, the time in the

semester, weather, and other factors. At the height of study room traffic, which closely corresponded to midterms and final exam periods, staff spent upwards of two hours per day checking the email account and responding to violations or any questions that came through the email.

Generally, staff did not closely physically monitor the study rooms simply because there was not enough time to do so. Instead, they periodically checked the rooms to ensure that students were complying with the food and beverage policies and to settle the few disputes that arose. Complaints regarding the study room reservation system were handled by all staff members, who worked quickly to find alternative group study space for students both inside and outside the library. However, by and large, the study rooms were self-policed by the students.

No reservation system is completely free from the need of staff monitoring. However, the Google Calendar appointment blocks were especially time-intensive because they require constant staff attention to address last-minute reservations or cancellations from users. The designated task force member had to leave the corporate email account open at all times during their shift to check that each unique reservation followed the policies and respond to any that did not. This need for constant monitoring meant that staff members were taken away from other projects and had to let policy violations slide by when they were made at times when the task force member was occupied by other responsibilities.

In addition to the day-to-day monitoring of the system, two members of the task force were also charged with maintaining statistics. Keeping meaningful statistics is an incredibly time-consuming aspect of the room reservation system in Google Calendar, but it is essential for collecting information about student use and misuse of the study rooms. Using a shared Google spreadsheet, two task force members entered information about each reservation slot into a spreadsheet (user's name, email, date, room size, and number of reserved hours) and looked up a user's affiliation/status (undergraduate, graduate, staff/faculty) through an internal system. Once staff input the raw data, they were able to use pivot tables to determine important information about study room use. The maintenance of good statistics added approximately an additional three hours per week of work, shared between two people; however, this number was significantly higher during busier times.

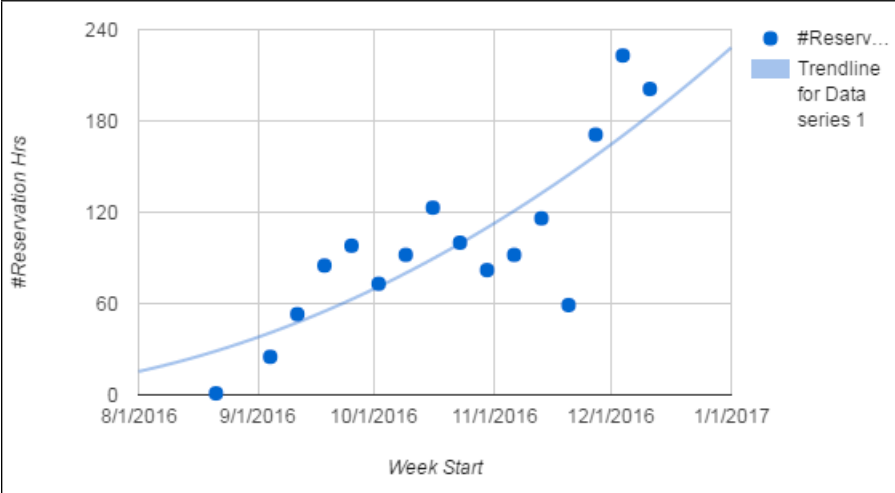
Results of the First Semester Pilot Program

In the pilot semester covering sixteen weeks from September to December 2016, 3,518 hours of study room time were reserved in 1,611 total reservations using the Google Calendar system at Quinn Library.

The busiest weeks corresponded roughly to the academic calendar, with 123 hours reserved during the week of midterm exams, October 16–22, and 565 hours reserved during the last week of the semester and final exams, November 27–December 17.²⁷ It should be noted that reservation hours and averages are affected by school closings, such as Thanksgiving break, which appears to make the demand for that week artificially low.²⁸ Taken together, rooms were reserved approximately 41 percent of the time that they were available, and, over the course of the semester, staff saw a steadily increasing demand for room bookings that maxed out at around 86 percent in the first week of final exams, December 11–17.²⁹ These increased numbers likely reflect the increased academic pressure during exam periods and as the semester progresses.

Clear patterns of use also emerged within each week. Midweek was the busiest time, while weekends saw considerably less traffic. Tuesdays and Wednesdays each had more than 600 reservation hours, whereas Saturdays and Sundays both had less than 400 reservation hours total, with 298 and 354 hours respectively.

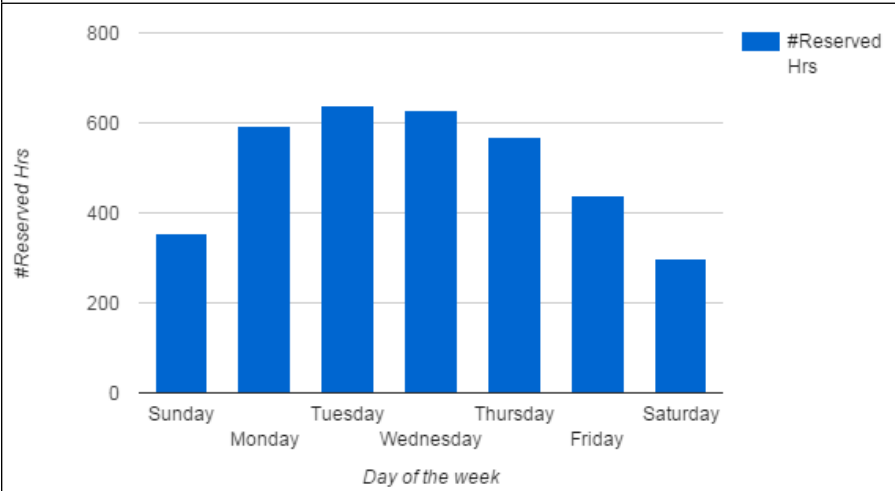
FIGURE 1
Number of Hours Reserved for Group Study Rooms Per Week



These usage patterns inform staff of when extra staffing and monitoring might be required and prevent spaces from being misused during the days they are most in demand. At the same time, this data suggests that staff have an opportunity to market the relatively underused weekend hours, including Fridays, more aggressively to maximize the utility of the group study rooms.

There were 529 unique students who used the group study room system as identified through individual email addresses. Of these users, the majority were graduate students; in addition, when compared to other user groups, graduate students made proportionally more reservations and reservation hours.

FIGURE 2
Total Number Of Hours Reserved For Group Study Rooms Per Weekday



Affiliation	# of Unique Users	# Reservation Hours	# Reservations
Graduate Students	323	2,430	1,070
Undergraduate Students	158	887	451
Unknown (used a non-Fordham email)	39	176	77
Faculty, Administrators, and Staff	9	15	13

This information helps staff to understand the primary user base for the study room reservation system. It may demonstrate that graduate students are more likely to plan their schedules in advance, or that graduate programs include more group project work, or that graduate students are more likely to spend time in the library in general. Additionally, Quinn Library shares the same building as the Gabelli Business School, which could also help to explain the higher percentage of graduate students using the study rooms.

Misuse of Study Rooms

Staff did not maintain formal statistics about the misuse of the study room reservation system or of the study rooms themselves. In this context, the task force defined “misuse” of the reservation system broadly, including disregarding the requirement to use a Fordham email address and creating more than two hours of reservations per day. In the future, capturing statistics concerning misuse could help staff to quantify how much time and energy they spend enforcing the system and to formulate procedures to avoid violations from occurring at all. In informal interviews, members of the task force learned that most students voluntarily abided by the policies that were elucidated on the landing page of the booking form. Moreover, among the students who either did reserve a study room under a personal email account or booked study rooms in excess of two hours per day, most appeared to amend their reservation habits after one warning email from the task force. However, there remained a small number of students who repeatedly misused the system by violating one or both of these policies. Within the study rooms, misuse includes violating any of the policies, including the food and drink policy, or talking at inappropriately high volumes. Continual misuse of either the reservation system or the rooms themselves led to the revocation of reservation privileges.

Limitations of the System and Usage Data

Staff acknowledges a certain amount of error in the collection of information about study room usage. Reserved study room hours do not correspond to hours of study room usage, as unreserved rooms are available first-come, first-serve, and staff have no way of tracking unreserved use of the rooms. At the same time, the Google Calendar system cannot account for no-shows. Numbers that show busiest weeks may be skewed because of school closings such as holidays or snow days. In addition, because Google Calendars does not have any built-in reporting features and all reporting was done manually, human error is possible despite staff efforts.

Conclusions

The statistics generated from the semester-long room reservation pilot study using Google Calendar, help staff to understand better student demands surrounding the

room reservation system as well as the library as a whole. First, the statistics show what kinds of students use the study rooms; and, while these users represent only a subset of library patrons, this information enables library staff to better understand a considerable portion of its users. Second, the high usage of the system shows that there is substantial demand for reservable, collaborative work spaces at the LC campus. While study rooms are occupied a significant percentage of time that they are available, only a relatively small percentage of LC students booked rooms. However, the number of unique users steadily climbed throughout the pilot semester and continues to this day.³⁰ In the future, staff will continue to push marketing efforts to ensure that all who are interested in reserving rooms are equipped with the knowledge of how to do so. At the same time, they will more strictly limit reservations to two hours per person and perhaps enforce a weekly limit as well, to ensure that everyone who wants to is able to take advantage of this resource. And third, the effort of managing a room reservation system has led staff to understand much more clearly the vast effort it requires to police and monitor such a system.

Although the results from the pilot semester were encouraging and positively demonstrate the need for a reservation system, staff determined that Google Calendar appointment slots is not well suited for their needs. The major problem with the use of Google Calendar as a reservation system is that it requires Quinn staff to constantly monitor and enforce the system. Library staff are already tasked with myriad duties related to the running of the library, and enforcing any reservation policies and managing systems poses a senseless and inordinate stress on their time. For the task force, while time was an initial consideration in the selection of the room reservation system, it was not valued as greatly as other factors. In the future, the task force will find a room reservation system that strikes a better balance in regard to staff time, cost, ease of implementation and monitoring, and protection of student privacy. The authors may undertake follow-up studies chronicling the implementation of a new study room system when actualized as well as exploring the long-term trends of study room use at Quinn Library.

Recommendations

Based on their experiences with using appointment slots in Google Calendar to manage study room reservations, the authors recommend the following to other institutions who are also considering implementing a room reservation system:

First, critically consider the staff time required to monitor a room reservation system. Time spent policing room reservations detracts from time that could be spent on other library projects. Therefore, where possible, use an automated reservation/appointment software so that staff can focus their efforts on projects that cannot be completed through automation. Ideally, any room reservation software should also have a built-in reporting function. Google Calendar does not offer this option, but there are many room reservation softwares, including open access options, that do. For any system that is able to automatically detect student information, libraries should collaborate with their IT department to ensure that student privacy is never compromised. Whether or not libraries select an automated system, but particularly if they select a manual system, such as Google Calendar or the use of analog sign-up sheets, consider making the creation and monitoring of the reservation system a team effort. Pay particular attention to high traffic days, especially during the middle of the week and during exam periods.

Also when choosing a system, consider creative approaches that make use of tools for which you already have access. For example, Google Calendar is not traditionally used as a room reservation system but it can be used for this purpose, as this paper has

shown. Then, evaluate your institution's unique needs and determine room reservation policies based on the needs of students at your university. The authors recommend implementing a periodic assessment of the policies and being open to revisions, if necessary. In addition, enforcing all policies strongly at the beginning of the system's implementation leads to student familiarity and acceptance of such policies. Based on this pilot program, most students will follow policies voluntarily after they know they are being enforced. This means that, by the end of the term, most students are already aware of and voluntarily abide by the rules.

Finally, promotion and marketing is an essential part of implementing a new resource, and it is beneficial to promote whichever online system is chosen in a variety of ways. For instance, consider promoting study rooms on social media, on the institution's website, in person at university events and library instruction sessions, and on easily visible signage using QR codes.

Be open to finding other ways of providing collaborative work spaces. Such spaces are growing in popularity with students of all levels and provide a private, academic place for students to engage with one another. Group study rooms are only one aspect of an academic library that facilitates collaborative, scholarly work for all.

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APPENDIX A. Room Reservation Policies

Availability of rooms: Study rooms will be open only when the library is open and staffed.

Eligibility: Current undergraduate, graduate, and doctoral students of all colleges at Fordham University, except for the School of Law, may reserve group study rooms.

Ineligibility: Law students, alumni, guests, visitors, and adjunct and full-time faculty may not reserve group study rooms.

Duration of reservation: Students may reserve up to 2 hours per day.

Frequency of reservation: Students may reserve up to 2 times per week.

Unreserved slots: If a study room is not officially reserved, students will be allowed to use it on a first-come, first-served basis.

Late arrivals: If a student properly procures a room through the online system, they maintain the right to use that room for the duration of their reservation. The room may be used, if vacant, on a first-come, first-served basis until the reserver arrives.

Code of conduct: Rooms are intended for the purpose of group study and research and will not be used for commercial activity, distribution of materials, goods, or services, or for solicitation. The code of conduct concerning food and beverages aligns with the library's overall policy, and groups will be expected to adhere to reasonable noise levels. Students are not permitted to sleep, move furniture, or leave personal items unattended.

Failure to abide by the room reservation policies will result in the revocation of reservation privileges.

Notes

1. See, for example, *Academic Librarianship Today*, ed. Todd Gilman (Lanham, Md.: Rowman & Littlefield, 2017).

2. "Fordham University Facts," Fordham University website, available online at https://www.fordham.edu/info/20088/fordham_facts [accessed 29 March 2017].

3. Interviews were conducted informally by Walsh Library staff and student workers during the spring 2016 semester.

4. A total of 7,858 undergraduate and graduate students at LC, as compared to 6,971 undergraduate and graduate students at RH (from "Fordham University Facts").

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10. Colin Storey, "Commons Consent: Librarians, Architects and Community Culture in Co-creating Academic Library Learning Spaces," *Library Management* 36, no. 8/9 (2015): 570–83, doi:10.1108/LM-05-2014-0057.

11. Bohyun Kim, "The Present and Future of the Library Mobile Experience," *Library Technology Reports* 49, no. 6 (2013): 22–24.

12. Bradley Daigle, "The Digital Transformation of Special Collections," *Journal of Library Administration* 52, no. 3/4 (Apr. 2012): 244–64.

13. The Task Force worked especially with the Fordham Maloney Law Library and the Fordham University Writing Center.

14. 25Live, Event Space Reservation System, Fordham University website, available online at <https://www.fordham.edu/info/22590/25live> [accessed 18 August 2018].

15. Seth Weintraub, "8 Million Students on Google Apps," *Fortune* (May 7, 2010), available online at <http://fortune.com/2010/05/07/8-million-students-on-google-apps/> [accessed 5 April 2017]. As of 2010, approximately 8 million students used Google Apps. This number may have changed significantly in the interim seven years but nevertheless gives a sense of the prevalence of Google in higher education.

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27. A total of 171 hours was reserved November 27–December 3; 223 hours were reserved December 4–10; and 201 hours were reserved December 11–17.

28. Only 59 hours were reserved November 20–26.

29. Demand continued to increase into the spring 2017 semester, where rooms were reserved approximately 49 percent of the time and maxed out at 91 percent.

30. At the end of the spring 2017 semester, there were 944 unique users as opposed to the 529 from the fall 2016 semester. This increase in usage may be a function of the increased awareness of the reservation system.