MRD Template

Fall 2024

CampusSpot

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Vision

For Northeastern University students who struggle to find suitable, quiet study spaces with the right equipment during peak times, CampusSpot is a mobile app that provides real-time updates on available seats across all study areas, including information on noise levels and available resources. Unlike traditional booking systems that only display room availability, CampusSpot allows students to quickly find the ideal spot to meet their needs, helping them save time, reduce stress, and stay productive even during critical study periods like mid-terms and finals.

Motivation

Customer Segments

Our core users are university students, which include undergraduates, graduate students, and researchers who often spend hours in the library. These students look for and value accessible, quiet study spaces and the necessary equipment to support their study routines, especially during high-pressure times like competitions, finals and midterms.

We believe students, especially those who prioritize quiet, uninterrupted study time, face difficulties finding suitable seating and room and encounter issues with noise levels and equipment availability. When we look at international students who may rely more heavily on campus resources for extended study hours, it can be seen that they are more likely to be affected.

Example Persona: Preeti Kulkarni, an MSIS graduate student, struggles to find a quiet place to study during exam times. For students like Preeti, CampusSpot would help in having productive

study sessions by eliminating the time-consuming 'hunt for a seat,' allowing them to focus on academics instead of seating availability.

University staff and administrators, who are responsible for optimal and happy space utilization, are also a valuable secondary audience. They would benefit from data insights on seating patterns and peak usage times, allowing them to make informed decisions to enhance study space management.

Example Persona: George M., a Technical Support Lead, manages space optimization strategies to improve resource allocation and reduce student complaints about study space shortages. University employers like him work to improve user adoption of the space management system and streamline booking processes for university spaces.

To validate our hypotheses, we conducted interviews of approximately 20 students. We mainly focused on understanding the challenges they face in locating available seating, noise levels, and access to necessary study resources. The sample included diverse student demographics, covering undergraduates, graduates, and international students, and targeted peak study times to capture the most relevant insights. Feedback from this trial highlighted recurring themes around seat availability, noise issues, and the impact on productivity.

Our interview questions determined the frequency and timing of study space use, seating preferences, and how seating availability impacts productivity. We also explored students' willingness to use a real-time seating app and preferences for seat characteristics such as noise level and equipment availability. Observational studies in study areas confirmed seating shortages during certain days and hours.

Early adopters are likely to include students who experience the most intense challenge of finding a good seating spot, such as graduate students, and others with demanding study schedules. Mainstream users may follow as CampusSpot's value becomes clear, especially if administrators promote the app based on usage data and positive feedback from early users. Early adopters are likely more familiar with app-based solutions and may prioritize features that address noise level and seating availability.

Unmet Needs

Primary Customer Segment: University Students
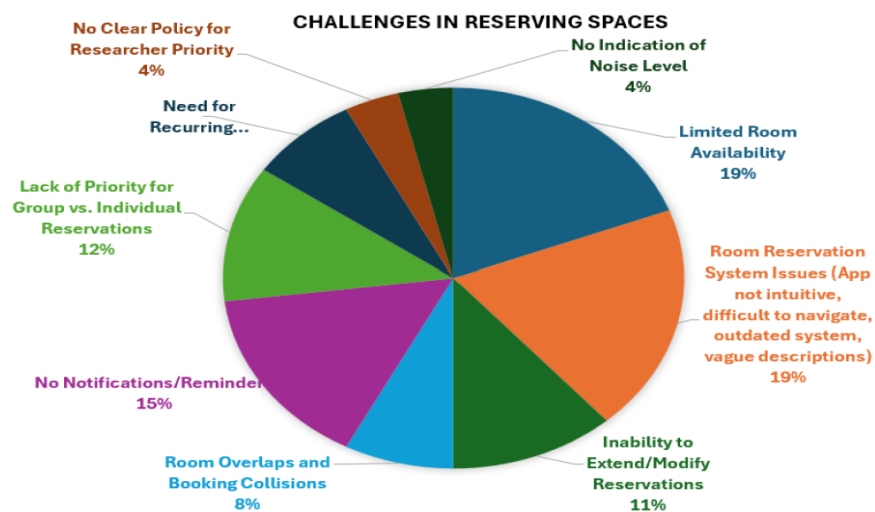
i.   Student Frustration with Seat Availability:
A hypothesis of the team members is that "We believe students experience major frustration and decrease of productive study time since they end up spending unnecessary time searching for a seat during peak study periods." This issue becomes highly challenging during times like midterms and finals, adding to the existing stress of students who are already coping with academic pressure. This constant search to find a suitable study space interrupts their focus, negatively affecting their

overall study experience and performance.

ii.   Disruption Due to Poor Study Conditions:
The second hypothesis we have is that "We believe students experience commotion and interruption when they, with no other option, end up in study spaces that do not meet their desires, such as areas with unwarranted noise or lack of required equipment." With limited options, students with no other choice will have to settle for less-than-ideal study conditions, impacting their concentration and reducing the effectiveness of their study sessions. For students, who may rely heavily on these spaces, the lack of access to proper environments can be challenging, paving way to discomfort and inefficiency.

To justify these hypotheses, we conducted interviews of roughly 20 students, capturing a mix of undergraduates, graduates, and research students. Questions ranged from their usual experiences with seating availability, ideal study space or room features, and frustrations they face during peak times. The responses were consistent in highlighting seat scarcity, the inconvenience caused because of noise levels, and lack of study resources which behave as barriers to effective study sessions. An example of this is interviews with students like Athrav Nirhali, which confirmed that he often, even in critical situations, spends time looking for an adequate space, which weakens his study quality.

CHALLENGES IN RESERVING SPACES

- No Clear Policy for Researcher Priority — 4%
- No Indication of Noise Level — 4%
- Limited Room Availability — 19%
- Room Reservation System Issues (App not intuitive, difficult to navigate, outdated system, vague descriptions) — 19%
- Inability to Extend/Modify Reservations — 11%
- Room Overlaps and Booking Collisions — 8%
- No Notifications/Reminders — 15%
- Lack of Priority for Group vs. Individual Reservations — 12%
- Need for Recurring...
- Lack of Priority for Group vs. Individual Reservations — 12%

Secondary (rather future) Customer Segment: Library Staff and University Administrators

i.   Lack of Data-Driven Space Allocation:
A hypothesis of the team is "We believe that the library staff face barriers in managing study spaces because they also lack real-time data on seating and demand patterns." Without the right amount of access or visibility into how spaces are being used throughout the day, staff face challenges to improve seating arrangements or make alterations based on student needs. This can lead to

overcrowded areas during peak times while other sections remain underutilized.

ii.   Challenges in Responding to Student Needs:
The second hypothesis with respect to secondary customer segment that that the team has is that "We believe that library administrators experience difficulty to fulfill student demands since they lack insights into students' preferences of seating as well as surroundings." Without data, administrators cannot proactively alter the layout, quiet zones, or equipment availability in study spaces for the better. This usually leads to negative student feedback and reduced satisfaction with respect to campus resources.

Through Interviews with study space staff and other technical administrators, we did notice a clear demand for data-driven insights. They expressed as to how much better the situation will become with right access to occupancy data as it will help them manage peak times more effectively and vary seating arrangements for student satisfaction. Observational studies in such spaces confirmed that even during certain high-demand times, a few sections go underutilized while others are filled to capacity, signaling a need for optimized space allocation.

CampusSpot seeks to meet these unaddressed needs by reducing student frustrations and enhancing both productivity and enjoyment during study sessions or discussions. Additionally, the platform provides library staff and administrators with actionable insights to optimize the study environment and manage space more effectively.

Existing Solutions

At Northeastern University, the primary space-booking app students use is Robin, with other possible options being LibCal, SpaceIQ, Envoy, and Roomzilla. These platforms traditionally provide features like real-time availability tracking and allow users to choose specific types of study spaces, such as group, individual or quiet areas. However, these apps are often designed with corporate environments in mind, focusing on business needs over the unique demands of a campus setting which involves more of a dynamic setup considering it has students with different schedules and different requirements. This leaves gaps in meeting students' distinct needs, such as study space flexibility, noise control, and convenient access to campus services. Consequently, while these apps serve basic functions, they lack features that could optimize the study experience within a university context.

We hypothesize that current solutions fall short in fully addressing student needs due to several limitations:
  i)   Lack of Noise Level Monitoring: Only a few apps, such as Envoy, Teem, and OfficeRnD, offer noise level tracking, which is essential for maintaining a productive study atmosphere.
  ii) Limited Integration with Campus Services: Many platforms, like Robin and Skedda, primarily connect with office tools (such as Outlook and G Suite) but lack the capability to integrate more extensively with services specific to campus environments.

iii) Restrictions on Equipment Booking and In-Session Adjustments: Few options, including Envoy and Teem, support equipment reservations, and most basic solutions don't allow editing of bookings mid-session.

iv) Lack of Cancellation Options: Current solutions for booking study spaces on campus often lack flexibility in managing reservations. Once booked, students cannot cancel if their plans change, leading to unused spaces when students don't show up. This inflexibility results in frustration and inefficient use of study spaces, as other students are unable to access booked but unused slots.

Interviews highlighted common challenges like noise disruptions, restricted access to equipment, and limited custom notification options. A competitor feature matrix further validates these gaps, highlighting how our platform can address them by including campus-focused features and noise monitoring capabilities.

Differentiation

As Northeastern University students, we intimately understand the challenges of finding and securing effective study spaces on campus. Our personal experience with these obstacles, combined with our understanding of the specific needs of our peers, uniquely qualifies us to develop this solution. Unlike business-oriented tools, our platform is designed to prioritize student productivity, offering real-time seat availability, easy booking and cancellation features, noise level insights, and easy integration with campus resources. This student-centered perspective enables us to create a tool that genuinely enhances the study experience within a university environment.

Why Now?

As students return to campuses in greater numbers post-COVID, there is a renewed need for efficient study space management due to increase in-person collaboration and higher demand for shared spaces. Rising enrollments and the growing popularity of group work amplify this need, making it essential to have solutions that enhance productivity. Recent technological advancements allow for real-time data tracking, and universities are now more open to adopting digital solutions that support a smoother, more efficient student experience. Current booking solutions are difficult to use, with confusing interfaces that make checking room availability challenging, as students noted in interviews. Through CampusSpot we aim to address this with a simpler, more intuitive design and features like real-time availability and flexible booking, meeting students' need for an accessible and efficient study space too. This makes it a prime moment to introduce CampusSpot, which addresses these evolving needs directly.

Use Cases

Use-Cases Based on Key Student Personas:

(1) Persona: University Student Seeking Ideal Study Spaces (Individual and Group)

Primary Goals:
  (i)   Locate Quiet Study Spaces: Find calm areas conducive to focused work.
  (ii)   Enable Productive Collaboration: Access study spaces optimized for group projects.
  (iii)   Seamless Reservations: Easily book study rooms with options for both quiet and collaborative spaces.

During peak times, it's often difficult for students to secure a quiet study space. The current app doesn't show noise levels, and its booking system is confusing, making it hard to distinguish between individual and group study areas.

Scenario Steps:
1. Open the App: Upon launching the CampusSpot app, students are greeted with a user-friendly home screen.
2. Select Study Type: They can choose between "Silent Study" and "Group Study" based on their needs. Here, they pick "Silent Study" according to the above persona.
3. Real-Time Availability Map: A campus library map appears, using color-coded indicators:
    • Green: Available quiet areas
    • Yellow: Moderate noise
    • Red: Noisy spaces (not ideal for silent study)
4. Each space also displays real-time noise levels for convenience.
5. Filter Options: Students refine results based on floor, seating type (like tables or booths), and proximity to facilities such as restrooms or outlets.
6. Detailed Space Information: Clicking on a green area opens details like the number of available seats, current noise levels, location photos, and student reviews on the space's quietness.
7. Reservation Process: They select a time slot and duration (1 hour, 2 hours, etc.), and receive a confirmation notification. A reminder alerts them 10 minutes before their booking.
8. Group Study Mode: For group sessions, students select "Group Study" mode. The app shows available rooms with capacity details, color-coded for group noise levels.
9. Check-In Feature: Upon arrival, students check in, updating the real-time noise and availability status for others.

CampusSpot addresses the frustrations of finding study spaces by combining real-time information, easy navigation, and clear options for silent or group study, significantly enhancing the on-campus study experience.

(1) Persona: University Student Focused on Efficient Planning and Health Safety

Primary Goals:
  (i)   Reserve in Advance: Secure study spaces well ahead of busy times.
  (ii)   Reduce Search Time: Avoid the hassle of physically searching for open seats.

(iii)   Stay Informed on Cleanliness: Ensure the sanitation status of study spaces is clear and up to date. During peak periods, students often struggle to find available study rooms and worry about cleanliness. The time lost searching for open spots adds to their frustration.

Scenario Steps:
1. Launch the App: Students navigate to the "Reserve Space" section after opening the app.
2. Select Date and Time: For busy weeks like midterms, they choose their preferred study date and time.
3. View Availability Calendar: A color-coded calendar shows study space availability:
    - Green: Open spaces
    - Yellow: Limited availability
    - Red: Fully booked
4. Apply Filters: Students can filter options by study area type, nearby facilities (restrooms, printers), and additional equipment (whiteboards, projectors).
5. Sanitation Status: Each room has an icon indicating its cleanliness:
    - Green: Recently sanitized
    - Yellow: Scheduled for cleaning
    - Red: Needs cleaning
6. Room Details: Clicking on a room provides occupancy and cleanliness scores from past users.
7. Book the Room: Students select an available time and room, then receive a booking confirmation and reminder half an hour before.
8. Check-In: They confirm their arrival, updating the room's occupancy status.
9. Feedback Loop: After using the room, students rate the cleanliness and overall experience, aiding future users and campus staff.
10. Cancellation Option: Students can modify or cancel bookings if plans change, freeing up the space for others.
11. Sanitation Updates: Regularly updated sanitation schedules help students choose rooms based on their cleanliness status.
12. Usage Analytics for Staff: Aggregated data on room usage, cleanliness ratings, and reservations allow staff to optimize cleaning schedules and room management.

This scenario emphasizes the importance of advanced booking, reducing search time, and maintaining a clear sanitation status, creating a smooth and safe experience for students using CampusSpot.

(1) Persona: University Student Reserving Space for Recurring Team Meetings

Primary Goals:
 (i)   1. Secure Spaces for Group Meetings: Reserve spaces for regular team discussions and collaborative work.
 (ii)   2. Easily Book Recurring Sessions: Make it simple to schedule rooms for consistent team

meetings.

(iii)   3. Understand Booking Limits: Ensure clarity on reservation restrictions to prevent booking issues.

Students often encounter difficulties when booking rooms for frequent team meetings, particularly around understanding booking time limits and frequency rules.

Scenario Steps:
1. Open the App: After launching CampusSpot, the student navigates to the "Book a Room" section.
2. Select Recurring Booking: They choose the "Recurring Meetings" option to reserve the room on a set schedule.
3. Enter Meeting Details: The student specifies the frequency (weekly or biweekly), duration, and start date for the meetings.
4. Check Availability: The app displays a color-coded calendar for available rooms:
   - Green: Available
   - Yellow: Limited availability
   - Red: Fully booked
5. Filter Room Type: Results can be sorted by room capacity and room type (e.g., tech-equipped, quiet, or collaborative).
6. Display of Booking Limits: Clearly displayed limits ensure students understand booking guidelines, like a two-hour maximum per session or a weekly recurrence cap.
7. Confirm the Room: Once a room is chosen, the student confirms the booking and sees details like room name, recurrence pattern, and total booked hours.
8. Receive Confirmation: A detailed confirmation is sent via email and app notification, with an option to add it to their calendar.
9. View Upcoming Reservations: Students can review, modify, or cancel all upcoming bookings in the app.
10. Get Reminder Notifications: Reminders are sent 24 hours and one hour before each meeting to keep team members on track.
11. Post-Meeting Feedback: Students provide feedback on room suitability, which enhances the reservation experience for others.
12. Access Help Resources: An FAQ section provides guidelines on booking limits and policies.

This scenario simplifies the process of booking spaces for ongoing team meetings, offering students a user-friendly system with transparent booking guidelines and reminders, allowing them to stay focused on their projects.

The above three use cases demonstrate how and why CampusSpot can streamline study space management, promote student productivity, and meet the specific needs of different campus user groups.

Market Size

To estimate CampusSpot's Total Addressable Market (TAM), we consider the increasing demand for digital tools that improve student access to resources and optimize campus space utilization. The broader higher education sector is anticipated to invest substantially in digital transformation, with a projected market value of $29 billion by 2028. This growth reflects rising interest in tools that support student productivity, optimize campus resource allocation, and streamline operations.[3] The global market for software dedicated to space optimization, which applies to both educational and corporate settings, was valued around $9.4 billion in 2022. It's expected to grow at an annual rate of 10% in the coming years, as campuses and companies alike seek efficient methods for resource management[1][2]. In the United States, the higher education industry is valued at approximately $670 billion, with a notable portion spent on facilities management and digital tools that enhance student engagement and efficiency. Space management solutions play a significant role in this, particularly as institutions aim to improve space availability during high-demand periods like exams and midterms[3]. Demand for campus space utilization tools is anticipated to rise as universities seek to support flexible study needs. By 2026, the education sector's space utilization market alone could reach $1.5 billion, driven by the need for solutions that manage study space availability and improve the overall student experience[1].

Caveats / Risks / Key Dependencies

Risk Category	Description	Mitigations
Privacy Concerns	Ensuring privacy for students and administrators is essential. Many students may feel uneasy about real-time monitoring of their location or seating preferences or even have concern about it being used, stored or shared. CampusSpot needs to make data anonymous and secure to build user trust.	Use clear data policies, anonymize user information, and implement strong security practices to reassure users about their privacy.
Legal / Patent Risks	Features like noise level tracking and real-time seating updates may converge with existing patents. Identifying potential patents early on will help avoid legal issues.	Conduct thorough patent research and seek legal guidance to identify existing patents in this space. When and where needed, pursue licensing, modify functionalities, or focus on unique implementations to avoid this convergence. These can help avoid costly legal complications and ensure compliance.
Piracy Concerns	CampusSpot's unique features could be at	Implement strong encryption,

	risk of unauthorized copying or misuse, especially in a university setting where tech-savvy users may attempt to replicate functions.	safe access controls, and intellectual property safeguards to protect against unauthorized replication. Regularly update security measures and ensure copyrighting unique features.
Interdependencies with University Systems	Integration with university systems, such as library management, student IDs, and security infrastructure, is essential for CampusSpot's functionality. Any downtime or incompatibility could impact app performance and user experience.	Collaborate closely with university IT and administrative teams from the start to ensure compatibility, optimize integration, and manage potential disruptions. Regular meetings and real-time troubleshooting can also help.
Reliance on Third-Party Technology	CampusSpot may depend on external providers for features like noise monitoring and seat tracking. If these providers face disruptions, it could affect CampusSpot's functionality.	Choose to rely on trusted vendors, establish backup partnerships, and consider developing alternative solutions for critical functionalities.
User Adoption and Familiarity	Adoption rates are crucial, but if the app feels complex or unfamiliar, it may hinder regular use. Users unfamiliar with digital booking systems may need guidance to understand the app's value.	Design a user-friendly interface with intuitive navigation and include clear, helpful tutorials and onboarding sessions. Engage campus resources like orientation programs to introduce students to the app.
Operational Dependencies	CampusSpot's real-time updates depend on stable campus Wi-Fi, posing risks if connectivity is weak or fails, affecting the ability to access up-to-date study space availability.	Optimize the app to work under low-connectivity conditions where feasible and add offline capabilities. Work with campus IT to troubleshoot all sorts of issues.

Strategic Considerations

Strategic Alignment with Northeastern University's Mission

- Student-Centered Innovation: The CampusSpot concept aligns with Northeastern University's goal of enhancing student experiences through technology-driven, flexible solutions. By addressing study space availability in real time, CampusSpot supports a responsive environment that enhances productivity and well-being.
- Support for a Connected Campus: Northeastern's mission to create a campus that is both

inclusive and adaptable is supported by tools like CampusSpot, which aims to improve access to vital study resources across all campus locations, both in Boston and globally.
- "Experience Unleashed" Initiative: The app complements Northeastern's "Experience Unleashed" initiative, which prioritizes digital transformation to enrich students' academic and non-academic interactions on campus. By leveraging digital solutions to improve resource accessibility, CampusSpot aligns closely with this vision [4][5].

Complementary Fit with Existing Digital Products
- Enhancing Campus Operations: CampusSpot would seamlessly integrate with Northeastern's existing suite of digital tools, which already includes resources like the MyNortheastern portal, a hub for personalized academic resources, schedules, and essential updates.
- Extending Student Engagement Platforms: Northeastern's mobile app assists students in navigating campus services, transportation, and events. CampusSpot would enhance this toolkit by focusing specifically on study space management, addressing a need that is not fully met by current offerings [5].
- Data-Driven Space Optimization: By providing real-time insights on study area occupancy, noise levels, and equipment, CampusSpot would deliver actionable data for administrators. This would support more efficient campus space management and planning, contributing to a data-informed campus experience that aligns with Northeastern's goal of creating connected, optimized learning environments.

Value-Add to Campus Ecosystem
- Stress Reduction for Students: The app's ability to show real-time seat availability reduces the frustration and time wasted searching for study spaces, especially during exams and busy periods.
- Informed Facility Planning: Administrators could use data from CampusSpot to make informed decisions about space utilization, helping balance student demand with available study spaces more effectively.

Team Members

1. Anagha Vasista – Focused on potential revenue generation, go/no-go decision, and market size assessments. She contributed to strategic considerations for product positioning. Anagha also ensured that the design aligns with user experience goals.
2. Nayana Magadi Nagaraj – Worked on competitor analysis and addressed specific risk factors involved with the product. Nayana additionally managed the development and maintenance of the product roadmap, outlining key features and functionalities critical to CampusSpot.
3. Utkarsh Gupta – Conducted competitor analysis alongside Nayana, focusing on differentiation strategies for CampusSpot's unique value in the market and collaborated with Bhakti on defining user cases.

4. Bhakti Paithankar – Carried out market research and user needs analysis to capture the main requirements of the target audience. Bhakti also developed user cases and motivations to understand and prioritize the needs of potential users, working closely with Utkarsh in these areas.

Additionally, each team member contributed to continuous research efforts and observational studies to gain real-time insights into user behavior and preferences.

Go/No Go Recommendation (to start working on PRD Report):

After a series of research, we're recommending moving forward with CampusSpot because we believe it directly addresses a significant gap in our university's study space management. It's a Go to Recommendation. Currently, students are spending valuable time hunting for study spaces, especially during peak periods like midterms and finals, which is both frustrating and unproductive. CampusSpot would solve this by providing real-time seating availability, noise level indicators, and easy booking—all features that students have expressed a strong need for.
Based on our research, the factors for 'Go' decision were:

- **Enhanced Campus Management**: The app would also give administrators valuable data on space usage patterns, helping them manage the demand more effectively, reduce overcrowding, and create a better overall campus environment.
- **Validated Need and High Demand**: Our interviews with students and staff have shown genuine interest in a tool like CampusSpot. Graduate students and research groups, in particular, expressed excitement about a tool that could streamline their study routines.
- **Competitive Advantage:** While privacy, patent, and adoption risks are existent, CampusSpot has significant differentiators such as its focus on real-time study space data, noise-level tracking, and equipment availability.

CampusSpot offers a tailored solution to the ongoing challenge of study space accessibility within the university setting. Its features align well with Northeastern University's mission to create a supportive and efficient learning environment. With clear student demand, a strong strategic fit, and manageable risks supported by targeted mitigations, the project demonstrates potential for success. Therefore, CampusSpot is recommended as a "Go" initiative.
The data from the chart highlights the key issues students encounter when choosing study spaces.

Key issues students encounter when choosing study spaces

- Time Spent Locating Seats
- Noise Levels
- Availability of Equipment
- Study Space Availability
- Ease of Booking
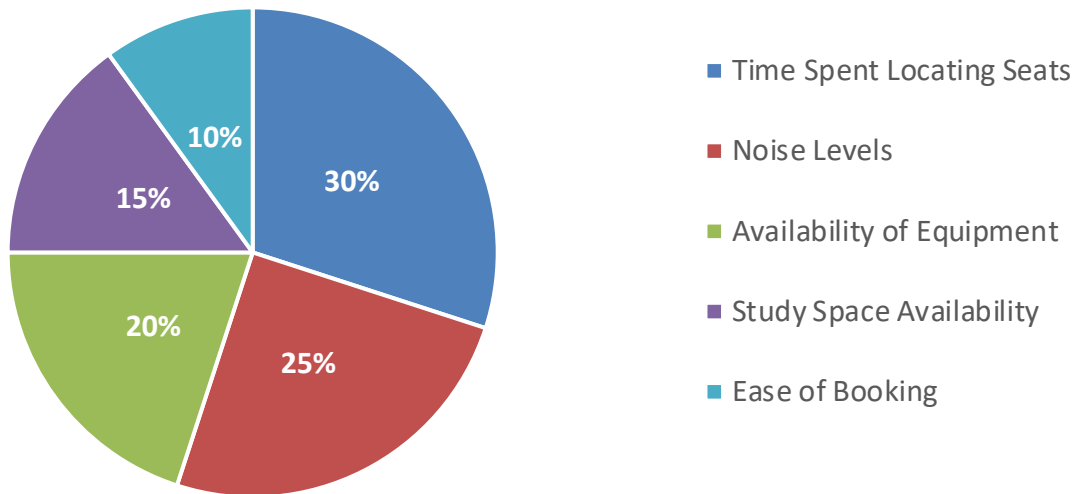
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