Is Your Campus Really Out of Space?

Expanding Enrollments without New Construction

My father's firm began working with institutions of higher education in the 1950s. I was lucky enough to join him in the 1980s (near the end of his career) before starting our current software company in 1994. Between the two of us, and all of our associates, we have probably talked with over two thousand colleges and universities. With very few exceptions, they tell us the same thing – "we're out of space."

What does that really mean? Prior to a couple of years ago, we didn't put too much thought into this claim. We just took it for face value. Now, however, we understand that it means that the most popular rooms are booked solid during the most popular times. For this reason, institutions with widely varying levels of utilization can be equally "out of space."

More specifically, we have grown to understand that the real goal is to expand the effective capacity of an institution – not improve its space utilization. The key to achieving this redefined goal is to address a phenomenon that we call a space "bottleneck".

The Problem: Pressure to do More with Less

Colleges and universities are being forced to support growing enrollments with shrinking resources. Enrollments at America's colleges and universities have been growing steadily. Enrollments are projected to increase by another 12% by the year 2012.

A study by the Society for College and University Planning indicates that, since 1974, the amount of actual classroom space has actually decreased in America's colleges and universities. The primary reason that they cite is that most new facilities are designed for non-instructional purposes.

The Old Approach: Space Utilization & Leftover Management

The most common approach to room scheduling is to start with a fixed timetable of classes and attempt to place all unscheduled activities into acceptable rooms. The trick is that you don't know if you have a problem until you are close to the end of the elusive solution. Only then does it become apparent that there are some activities that can't be placed. Concessions – like moving activities to less desirable rooms or times – must then be made to schedule these "leftovers" (the classes that you attempt to assign last). Institutions that use a room scheduling optimization tool should have fewer unassigned activities and a more equitable leftover list; but they are still left to deal with leftovers with few viable time/room options.

Part of the problem is that most people think that room scheduling is a space utilization exercise. Space utilization is always calculated as an average across the entire scheduling week, which leads people to expend time and political capital to achieve efficiencies in the entire schedule. They fail to understand that changes designed to improve efficiency, when applied outside of the bottlenecks, don't matter.

It is important to understand that no scheduling process or tool can actually improve your space utilization. Space utilization is simply the statistical result of student load (contact hours) divided by available instructional space (available contact hours, or seats multiplied by hours the campus is open). Let assume, for the sake of illustration, that there are 100 students on a small campus, all of whom take 15 hours per week. This campus has 5 rooms with 15 seats each and a 50-hour scheduling week. For this campus, space utilization would be:

(100 students x 15 hours per week) / (5 room x 15 seats each x 50 hours per week), or 1,500 / 3,750 = 40%

The only way for this campus to improve on their 40% utilization (which is much higher than what we see on most campuses) is to enroll more students or take away rooms. How, then, can an institution attack this issue proactively and realize significant results?

The Bottleneck Busters: Expand your Campus' Capacity

The process of expanding enrollments without building more space is an exercise in bottleneck management. Your bottleneck rooms and the course offerings that are scheduled into them are your only barriers to growth. Surprisingly, other rooms and activities have no impact on growth potential. If bottlenecks are not specifically addressed, they will limit an institution's ability to grow enrollments and expand offerings to existing students – which will have an adverse affect on graduation rates.

Once you have identified your bottlenecks, you should prioritize them by impact on effective capacity. Attacking the most significant bottlenecks is a powerful way to expand your campus' effective capacity.

For example, consider typical institution "X" (next page):

Typical Institution "X"

Bottleneck Rooms
High-tech classrooms and large lecture rooms (the bottleneck rooms) make up 50 of the campus' 500 instructional rooms.

Bottleneck Activities
10% of the course offerings (350 of 3,500 offerings) are scheduled in the bottleneck rooms during the times of 9 to noon, Monday through Friday. On average, these rooms are 95% utilized during those times.

Growth Goal
The institution needs to grow enrollment by 10% (10,000 FTE student campus to 11,000 FTE), but does not have funding to build and operate new buildings.

Solution Options
Renovation/New Construction Plan - Adding about 5% to the inventory of bottleneck rooms (from 50 to 53), either through construction or renovation, will also add 10% to the effective capacity of the campus.

Allocation Policy - Moving about 5% of the bottleneck offerings (17 of 350) to other rooms or times will add 10% to the effective capacity of institution "X", allowing the institution to immediately support 11,000 FTE students.

How can 3 rooms or 17 activities have such a dramatic impact on capacity? The answer is that these rooms and activities are in the bottleneck. Adding three new rooms reduces primetime utilization of the bottleneck rooms to under 90%, given the existing activity load. Moving 17 activities reduces primetime utilization of the bottleneck rooms to under 90%, given the existing room inventory.

In either case, the campus can now accommodate a proportionate 10% increase in seats available for registration (assuming faculty is also available for this growth).

Allocation Policy Illustration - The table below shows the total number of bottleneck activities and the number that would need to be moved (in parentheses, by time and day). The total number of three-hour sections that would need to be moved to facilitate 10% enrollment growth is 17.

Bottleneck activities	**Mon**	**Tues**	**Wed**	**Thu**	**Fri**
9 - 10:00 AM	46 (1)	50 (5)	46 (1)	50 (5)	45 (0)
10 - 11:00 AM	48 (3)	50 (5)	48 (3)	50 (5)	46 (1)
11 - 12:00 PM	47 (2)	46 (1)	47 (2)	46 (1)	46 (1)

As illustrated above, you can facilitate enrollment growth by making high impact room or time moves in your bottleneck. This simple example shows how powerful an allocation policy can be. For this reason, we have begun to assist our clients in the development of academic scheduling policy that includes maximum bottleneck allocations for each department. Often, a maximum ratio of primetime to total sections that each department offers is a good way to enforce a time spread for all activities.

Institutions are forced to be even more resourceful when rooms can't be added and activities can't be moved to different times. The following are some innovative solutions that can reduce or remove scheduling bottlenecks:

Other Innovative Solutions:

Update old room data – When is the last time that you verified your room inventory? A walking tour of your campus can lead to some interesting discoveries. You could have more space than you think.

Addressing room ownership – Do your departments "own" general purpose rooms? Have classrooms been redefined as labs so that departments can control them? At a minimum, these rooms should be made available for general scheduling after the owning department has submitted their room requests.

Scheduling "additional" rooms – Some institutions allow sections to take two rooms for one time slot. This practice has an obvious, negative affect on capacity.

Addressing room feature requirements – Are rooms with certain features in such high demand that those rooms become a bottleneck? A study of bottleneck activities might point to a need to add equipment in certain rooms or tighten the criteria by which those features are requested.

Standard meeting blocks – Some institutions have adopted policies that mandate adherence to standard meeting patterns. This approach can greatly reduce waste caused, for example, by non-standard one-hour meetings conflicting with two other standard one-hour meetings.

The Recommended Approach: Smart Scheduling

A global perspective is often needed when attempting to improve on the often decentralized process of room scheduling. We recommend forming a smart scheduling committee comprised of personnel from the academic scheduling, academic departments, the business office, information technology, and the facilities office. This group should seek to develop a consensus about how to adequately plan for the growth of the institution, and then attack bottlenecks to grow in some of the ways mentioned in this article.

Tom Shaver is the Founder and CEO of Ad Astra Information Systems, which was formed in 1994 as an offshoot of his family's educational consulting and design firm. Ad Astra has over 575 higher education clients.