

METHODOLOGY

Academic section schedules from a previous, representative academic term (Fall 2011) were studied for the Main campus. Utilization reports from a commercial scheduling software package, Astra Schedule, were then customized to determine usage patterns by room type, size and day/time within a 50-hour standard scheduling week and a 24-hour primetime scheduling week. Reports highlight “room hour utilization” (the percentage of a scheduling week that a room or group of rooms is in use). Room hour utilization standards are broken down into the following categories for the study findings:

Utilization Category	Utilization
Low	< 20.00%
Moderately Low	20.00 – 34.99%
Moderate	35.00 – 49.99%
Moderately High	50.00 – 64.99%
High	65.00 – 80.00%
Very High	> 80.00%

A standard scheduling week for a post-secondary campus varies from 45 to 90 hours per week (total opportunity to schedule). The standard scheduling week for UNT is 50 hours (8:00 a.m. – 6:00 p.m., Monday through Friday).

UNT’s primetime scheduling week is 24 hours (9:00 a.m. – 3:00 p.m., Monday through Thursday). To analyze UNT’s ability to maximize room utilization, some reports included in this study look at the potential capacity of Classrooms using the assumption that class meeting patterns could be spread evenly throughout the standard or primetime scheduling weeks.

Within each of the 50-hour standard and 24-hour primetime scheduling weeks, 80 percent utilization (40 hours and 19 hours, respectively, per week per room) is considered an effective, reasonable and sustainable capacity.

TERMINOLOGY

The following is a list of terms and definitions used throughout this study and the attached reports:

Term	Definition
Room Hours/Week	Actual hours a room is used in an average week during the analyzed term.
Room Hour Utilization	Percentage of room hours used (Total Room Hours / (Scheduling week (50, 24 hours) x Number of rooms with specified room type)).
Prime Ratio	Percentage of hours scheduled during primetime hours (Prime room hours / Total Room Hours).
Bottleneck	80 percent utilization or higher of a particular room type.
Scheduled Hours	Total hours actually scheduled in a room. Includes only those hours for classes meeting within specified time periods. Hours are broken down into 30-minute increments. Example: 30 minutes counted in primetime hour utilization for class meeting on Monday from 8:30-9:30 a.m. (since primetime begins at 9:00 a.m.).
Average Enrollment / Maximum Enrollment	Weighted average of class actual enrollment or maximum enrollment caps. Enrollment is weighted to eliminate issue with classes meeting for different durations. Example: one three-hour class is weighted higher than a class that meets for just one hour.
Seat Fill	Percent of seats in use when room is scheduled (Actual or Max Enrollment / Capacity).

FINDINGS

FINDING 1 – UTILIZATION BASED ON A 50-HOUR STANDARD SCHEDULING WEEK IS MODERATE

General

A detailed report of utilization by room type and size category for a 50-hour scheduling week (8:00 a.m. – 6:00 p.m., Monday through Friday) is attached as **Report 1**.

Comments

Average room hour utilization for all room types at UNT is moderate (44.64 percent). The Classroom room type has moderately high utilization (54.22 percent). Other room types, on average, have moderate utilization (38.47 percent).

Results

Utilization summary data during the 50-hour standard scheduling week is shown in **Table 1**, below:

Table 1 – Room Hour Utilization for 50-hour Standard Week during Fall 2011

Main			
Room Type	Rooms	Room Hours/Week	Room Hour Utilization
Classroom	189	5,123.93	54.22%
Other room types	293	5,635.48	38.47%
Total	482	10,759.41	44.64%

FINDING 2 – UTILIZATION DURING THE PRIMETIME SCHEDULING WEEK VARIES BY ROOM TYPE

General

A detailed report showing room usage during the 24-hour primetime scheduling week (9:00 a.m. – 3:00 p.m., Monday – Thursday) is attached as **Report 1**.

Comments

Average room hour utilization for all rooms during the 24-hour primetime scheduling week is moderately high (57.86 percent). The Classroom room type has high utilization (73.21 percent). Other room types, on average, have moderate utilization (47.95 percent).

Results

Utilization summary data (showing usage during the 24-hour primetime scheduling week) is shown in **Table 2**, below. This table includes the prime ratio, or percentage of all utilization that occurs during primetime. The prime ratio at an institution where use is evenly distributed across the entire week would equal the ratio of prime room hours compared to the total hours in the standard week. For example, assuming completely even distribution, the prime ratio of scheduling during a 24-hour primetime week within a 50-hour standard week is 48 percent.

Table 2 – Room Hour Utilization during 24-hour Primetime Week

Main				
Room Type	Rooms	Room Hours/Week	Room Hour Utilization	Prime Ratio
Classroom	189	3,321.00	73.21%	64.81%
Other room types	293	3,371.83	47.95%	59.83%
Total	482	6,692.83	57.86%	62.20%

FINDING 3 – UTILIZATION OF CLASSROOMS DURING THE PRIMETIME SCHEDULING WEEK VARIES BY SIZE CATEGORY

General

Attached **Report 1** shows utilization of rooms by size category. Utilization of Classrooms varies by room size category.

Comments

During the 24-hour primetime scheduling week, overall utilization of the Classroom room type is high (73.21 percent). Utilization ranges from 21.88 percent in the 1 – 15 seat category to 77.60 percent in the 100 + seat category.

Results

UNT’s 24-hour room utilization by size category (including the prime ratio, or percentage of all utilization that occurs during primetime) for Classrooms is shown in **Table 3**, below:

Table 3 – Utilization during Primetime by Size Category

Main				
Classroom				
Capacity Group	Rooms	Prime Room Hours/Week	Prime Room Hour Utilization	Prime Ratio
1 - 15 Seats	6	31.50	21.88%	69.76%
16 - 25 Seats	12	215.50	74.83%	61.19%
26 - 50 Seats	122	2,199.00	75.10%	65.91%
51 - 100 Seats	21	353.50	70.14%	64.93%
100+ Seats	28	521.50	77.60%	61.64%
Total	189	3,321.00	73.21%	64.81%

FINDING 4 – UNT HAS BOTTLENECKS DURING PRIME SCHEDULING TIMES IN CERTAIN SIZE CATEGORIES OF CLASSROOMS

General

The most effective way to grow enrollments in a fixed amount of space is to focus on space bottlenecks. Space bottlenecks occur in an institution’s most popular types of rooms during their most popular times. UNT has Classroom bottlenecks throughout the day. Utilization of other room types or times outside of the bottleneck (even though they impact statistical averages such as the data in the previous tables) is immaterial to growth capacity. UNT’s Classroom bottlenecks are highlighted in attached **Report 2**. This report highlights space bottlenecks defined as room type/time combinations wherein 80 percent or more of all rooms in the size category are in use.

Comments

The 16 – 25 seat, 26 – 50 seat, and 100+ seat Classrooms show bottlenecks throughout much of the 24-hour primetime scheduling week, particularly during primetime hours before 1:00 p.m. Classrooms with 51 – 100 seats show bottlenecks primarily on Tuesdays and Thursdays only, during the 24-hour prime week.

Results

UNT’s Classroom bottlenecks are highlighted in **Table 4** below:

Table 4 – Percent of Classrooms in Use (Bottlenecks Highlighted)

1 – 15 Seats, 6 Rooms

Day	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p
Mon	0%	0%	17%	17%	0%	0%	0%	0%	0%	17%	33%	17%	17%	17%
Tue	17%	50%	67%	83%	50%	17%	0%	17%	17%	33%	50%	50%	50%	0%
Wed	0%	0%	17%	17%	0%	17%	0%	0%	0%	33%	33%	17%	17%	0%
Thu	83%	83%	83%	17%	33%	17%	0%	17%	17%	33%	33%	33%	17%	0%
Fri	17%	17%	17%	17%	17%	17%	17%	17%	17%	0%	0%	0%	0%	0%

16 – 25 Seats, 12 Rooms

Day	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p
Mon	42%	92%	100%	92%	83%	67%	67%	75%	58%	50%	42%	33%	33%	0%
Tue	33%	75%	75%	75%	100%	75%	67%	92%	83%	33%	67%	67%	67%	25%
Wed	42%	92%	100%	92%	83%	67%	75%	75%	58%	25%	75%	67%	58%	25%
Thu	42%	83%	83%	75%	100%	75%	58%	92%	75%	42%	58%	50%	50%	17%
Fri	50%	92%	100%	83%	33%	17%	17%	17%	8%	8%	8%	8%	8%	0%

26 – 50 Seats, 122 Rooms

Day	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p
Mon	27%	80%	79%	80%	82%	78%	73%	67%	43%	32%	61%	59%	49%	16%
Tue	45%	85%	80%	84%	89%	83%	77%	83%	66%	41%	67%	61%	57%	21%
Wed	25%	80%	80%	82%	84%	79%	77%	69%	44%	32%	62%	60%	52%	20%
Thu	44%	82%	79%	81%	89%	84%	74%	77%	60%	32%	54%	48%	41%	20%
Fri	11%	52%	51%	53%	36%	32%	19%	8%	6%	0%	1%	1%	1%	1%

51 – 100 Seats, 21 Rooms

Day	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p
Mon	29%	62%	62%	76%	76%	76%	67%	71%	48%	24%	57%	57%	52%	24%
Tue	57%	81%	71%	81%	86%	86%	81%	71%	62%	38%	67%	62%	62%	33%
Wed	29%	62%	62%	76%	71%	86%	48%	62%	38%	14%	52%	48%	43%	29%
Thu	57%	81%	71%	81%	81%	86%	81%	81%	76%	24%	71%	67%	57%	38%
Fri	10%	33%	33%	57%	33%	38%	14%	5%	0%	0%	0%	0%	0%	0%

100+ Seats, 28 Rooms

Day	8a	9a	10a	11a	12p	1p	2p	3p	4p	5p	6p	7p	8p	9p
Mon	43%	82%	79%	86%	82%	64%	64%	71%	61%	29%	57%	46%	43%	21%
Tue	61%	96%	93%	79%	93%	82%	86%	89%	75%	18%	64%	61%	46%	32%
Wed	43%	82%	79%	86%	82%	68%	64%	68%	57%	36%	61%	57%	54%	36%
Thu	57%	96%	93%	79%	93%	82%	82%	86%	75%	21%	54%	50%	43%	21%
Fri	39%	68%	64%	64%	54%	29%	29%	14%	11%	0%	0%	0%	0%	0%

FINDING 5 – AVERAGE SEAT FILL IN CLASSROOMS VARIES BY SIZE CATEGORY

General

UNT’s seat fill utilization (max or actual enrollment divided by room capacity) for all rooms is highlighted in attached **Report 3**. This report shows the seat fill ratio of rooms by size category, with the average max/actual enrollment for activities scheduled in those rooms and the average room capacity of all rooms in that category. The averages are weighted to reflect the average fill ratio of each activity scheduled in each category and the overall average, respectively.

Comments

The average Classroom seat fill ratio for all size categories based on max enrollment is 88.56 percent. Comparatively, the average Classroom seat fill ratio for all size categories based on actual enrollment is 77.70 percent.

In size categories where seat fill ratios average higher than 100 percent, it is evident there is some data inconsistency with the average enrollment and max enrollment values compared to the capacity of the room in which sections were scheduled.

Filling rooms to capacity is a strategy that can be used to get the highest utilization possible out of lecture space. With average fill based on actual enrollment approaching 80 percent, there is diminished opportunity for growth by improving seat fill. However, since scheduling assignments are typically done based on max enrollment, it is critical that max enrollment values be analyzed to ensure they are reflective of actual class sizes, to achieve the highest seat fill possible.

Results

The weighted average seat fill ratio for all Classrooms by size category is shown in **Table 5**, below:

Table 5 – Seat Fill

Classroom						
Capacity Group	Rooms	Avg. Capacity	Avg. Enroll.	Seat Fill Enroll.	Avg. Max Enroll.	Seat Fill Max Enroll.
1 - 15 Seats	6	13.76	24.27	176.31%	34.22	248.63%
16 - 25 Seats	12	24.81	20.32	81.92%	22.88	92.25%
26 - 50 Seats	122	41.24	29.76	72.17%	35.03	84.95%
51 - 100 Seats	21	77.13	59.59	77.26%	69.32	89.87%
100+ Seats	28	147.84	122.93	83.15%	134.59	91.04%
Total	189	61.28	47.62	77.70%	54.27	88.56%

FINDING 6 – THE RATIO OF CLASS HOURS OFFERED IN CLASSROOMS DURING PRIMETIME VARIES BY SUBJECT

General

A detailed report of Classroom utilization by subject during the primetime scheduling week is attached as **Report 4**. This report includes prime ratio, which shows the percentage of total class hours of each subject offered during primetime.

Comments

The prime ratio for each subject at an institution where Classroom use is evenly distributed across the entire week would equal the ratio of prime room hours compared to the total hours in the standard week. For example, assuming completely even distribution, the prime ratio of a 24-hour primetime within a 50-hour standard week is 48 percent.

Completely even distribution across a 50-hour standard scheduling week may not be realistic (early morning and late afternoon classes may not fit into all instructor and student schedules). However, **Report 4** will give insight into which programs are offering the highest percentage of classes during primetime. This can assist in the enforcement of an academic scheduling policy emphasizing even class distribution across the entire standard scheduling week.

Results

Utilization summary data of Classrooms for the fifteen subjects offering at least ten sections with the highest prime ratio is shown in **Table 6**, below:

Table 6 – Classroom Prime Ratio by Subject

Subject	Number of Classes	Total Room Hours	Room Hours During Primetime	Prime Ratio
ITAL	10	24.00	20.00	83.33%
HLTH	12	36.00	27.00	75.00%
JAPN	18	46.00	34.00	73.91%
EDEE	39	72.00	52.00	72.22%
EDRE	27	81.00	58.00	71.60%
COMM	73	152.00	108.00	71.05%
GERM	20	51.00	36.00	70.59%
FREN	40	105.00	73.50	70.00%
PHYS	61	124.00	83.00	66.94%
MEEN	23	52.00	33.00	63.46%
SPAN	118	323.50	200.00	61.82%
MDSE	15	44.00	27.00	61.36%
CHEM	61	119.00	73.00	61.34%
PSCI	62	186.00	113.00	60.75%
MATH	152	456.50	276.00	60.46%

FINDING 7 – UNT HAS OCCURRENCES OF NON-STANDARD MEETING PATTERNS

General

Scheduling classes using standard meeting patterns has the benefit of offering standardization, efficiency and student accessibility to class schedules. Students and faculty benefit from an orderly, scalable offering matrix of classes with reduced potential for conflicts. In truly standardized schedules, classes of the same length will have the same meeting pattern blocks. Classes that meet for more than one hour have their standard start times dictated by the length of the class and do not cross other blocks. Similarly, three-hour classes start every three hours assuming a break over the lunch hour. A non-standard meeting pattern is defined as a class falling outside these parameters. Attached **Report 5** looks at all the meeting patterns used in Classrooms in the analyzed term and breaks down individual class meetings by length.

Comments

While most meeting patterns at UNT appear to be standardized, there are occurrences of non-standard meeting times throughout the schedule. Attached **Report 5** can be analyzed and could assist in the enforcement of standard times to be used in an official scheduling policy.

Results

The 15 most-used meeting patterns for three-hour classes in Classrooms are shown in **Table 7**, below.

Table 7 – Fifteen Most Common Three-Hour Meeting Patterns in Classrooms

Meeting Pattern	Number of Sections
TR 11:00AM-12:20PM	148
TR 9:30AM-10:50AM	134
TR 12:30PM- 1:50PM	127
MWF 9:00AM- 9:50AM	98
MWF 11:00AM-11:50AM	96
TR 2:00PM- 3:20PM	96
MWF 10:00AM-10:50AM	92
TR 3:30PM- 4:50PM	77
TR 8:00AM- 9:20AM	76
MWF 12:00PM-12:50PM	65
MW 2:00PM- 3:20PM	49
T 6:30PM- 9:20PM	49
W 6:30PM- 9:20PM	44
R 6:30PM- 9:20PM	43
T 5:30PM- 8:20PM	42

FINDING 8 – UNT HAS AN EFFECTIVE GROWTH CAPACITY, BASED ON ON-GRID PRIMETIME MEETING PATTERNS, OF 15.76 PERCENT

General

A detailed utilization report for Classroom on-grid, three-hour, primetime meeting patterns, including effective utilization and capacity, is attached as **Report 6**.

UNT’s course schedule contains ten statistically dominant, three-hour meeting patterns during the 9:00 a.m. to 3:30 p.m., Monday and Wednesday; 9:30 a.m. to 3:30 p.m., Tuesday and Thursday; and 9:00 a.m. to 2:00 p.m. Friday on-grid meeting pattern primetime. By analyzing all activities scheduled in Classrooms that use those ten on-grid meeting patterns, as well as all additional activities that use off-grid meeting patterns that cross over the on-grid patterns, an effective primetime utilization and growth capacity can be calculated. This methodology of calculating growth capacity assumes the need for available rooms during the most statistically popular meeting patterns. An effective primetime utilization of 95 percent, using this methodology, is considered a reasonable and sustainable capacity.

Comments

Using the on-grid meeting pattern approach, UNT’s Classroom total effective primetime utilization is 82.06 percent. The on-grid meeting pattern with the highest effective utilization is TR 9:30 a.m. to 10:50 a.m. (84.66 percent).

Assuming 95 percent as sustainable on-grid meeting pattern utilization, UNT has an effective growth capacity during primetime of 15.76 percent over current usage.

Results

UNT’s on-grid meeting pattern utilization for Classrooms, with on-grid and off-grid meeting pattern usage delineated, is shown in **Table 8**, below:

Table 8 – On-Grid Meeting Pattern Utilization

On-Grid Meeting Pattern	On-Grid Meeting Pattern Hours	On-Grid Meeting Pattern Utilization	Off-Grid Room Hours	Off-Grid Meeting Pattern Utilization	Total Effective Utilization
MWF 9:00 am - 9:50 am	261	46.03%	189	33.33%	79.37%
MWF 10:00 am - 10:50 am	258	45.50%	198	34.92%	80.42%
MWF 11:00 am - 11:50 am	270	47.62%	198	34.92%	82.54%
MWF 12:00 pm - 12:50 pm	168	29.63%	303	53.44%	83.07%
MWF 1:00 pm - 1:50 pm	102	17.99%	360	63.49%	81.48%
MW 2:00 pm - 3:20 pm	138	24.34%	318	56.08%	80.42%
TR 9:30 am - 10:50 am	375	66.14%	105	18.52%	84.66%
TR 11:00 am - 12:20 pm	390	68.78%	84	14.81%	83.60%
TR 12:30 pm - 1:50 pm	363	64.02%	102	17.99%	82.01%
TR 2:00 pm - 3:20 pm	279	49.21%	192	33.86%	83.07%
Total	2,604	45.93%	2,049	36.14%	82.06%

FINDING 9 – UNT HAS OFF-GRID MEETING PATTERN WASTE DURING PRIMETIME OF 16.40 PERCENTGeneral

A detailed report of Classroom utilization by on-grid meeting patterns, including off-grid waste and capacity, is attached as **Report 6**.

UNT's course schedule contains ten statistically dominant, three-hour meeting patterns during the 9:00 a.m. to 3:30 p.m., Monday and Wednesday; 9:30 a.m. to 3:30 p.m., Tuesday and Thursday; and 9:00 a.m. to 2:00 p.m. Friday on-grid meeting pattern primetime. By comparing the actual room hour usage of activities, including effective usage based on overlap of on-grid meeting patterns, off-grid waste can be calculated.

For example, an activity meeting from 10:30 a.m. to 11:30 a.m. on Monday, Wednesday and Friday would account for three actual room hours. However, since it prevents that room from having an activity during both the MWF 10:00 a.m. – 10:50 a.m. and MWF 11:00 a.m. – 11:50 a.m. on-grid meeting patterns, it is using six effective primetime meeting hours. This creates three hours of off-grid waste.

Comments

UNT's Classrooms are scheduled for 4,653 total effective primetime hours (82.06 percent utilization). Those hours include approximately 763 hours of off-grid waste (16.40 percent).

Assuming 95 percent as effective primetime utilization, removing the off-grid waste (by scheduling only during on-grid meeting patterns) would give UNT a theoretical growth capacity during primetime of 32.16 percent over current usage.

SCENARIOS

To address the bottlenecks shown in Finding 4 and achieve maximum utilization of Classroom space during prime scheduling times, UNT should consider the following scenarios which address potential high-impact changes in scheduling practices/policies. These scenarios would allow UNT to use its existing space most efficiently and support future enrollment growth as necessary. Some of the scenarios would also promote a more evenly spread schedule, which would help alleviate student conflicts.

Each scenario uses either a 50-hour standard scheduling week (8:00 a.m. – 6:00 p.m., Monday through Friday) or a 24-hour primetime scheduling week (9:00 a.m. – 3:00 p.m., Monday through Thursday). An effective capacity of 80 percent room hour utilization is assumed as an effective, reasonable and sustainable level. This standard creates an effective capacity of 40 hours for the 50-hour standard week and 19 hours for the 24-hour prime week.

These scenarios focus only on the Classroom room type. Since proportional growth can only occur at the rate of the rooms that are “most popular,” the lesser used space is immaterial in these scenarios.

SCENARIO 1 – SPREADING UTILIZATION ACROSS THE 50-HOUR STANDARD SCHEDULING WEEK

IMPACT = VERY HIGH

General

The objective of this scenario is to study the additional Classroom capacity afforded by spreading utilization throughout the 50-hour standard scheduling week (8:00 a.m. – 6:00 p.m., Monday through Friday). This scenario is based on data contained in **Report 1**.

Assumptions

Utilization could be more evenly spread to early morning, afternoon and evening time slots. All rooms would be used proportionally. Eighty percent room hour utilization is assumed as a reasonable, sustainable level, resulting in a 40-hour per room usage cap for a 50-hour week.

Comments

Spreading utilization to non-primetime hours is the most common approach to capacity and conflict management. Student and instructor schedules must be realistically kept in mind when spreading class offerings over an entire 50-hour scheduling week.

Results

The impact of Scenario 1 is very high. All size categories of Classrooms show at least 30 percent growth potential when looking at spreading classes over the entire 50-hour standard week.

Scenario 1 – Spreading Utilization Across 50-hour Standard Scheduling Week

Main Classroom					
Capacity Group	Rooms	Current Room Hours/Week	Cap. Room Hours	Growth Hours	Growth %
1 - 15 Seats	6	45.16	240.00	194.84	431.49%
16 - 25 Seats	12	352.16	480.00	127.84	36.30%
26 - 50 Seats	122	3,336.18	4,880.00	1,543.82	46.28%
51 - 100 Seats	21	544.44	840.00	295.56	54.29%
100+ Seats	28	846.00	1,120.00	274.00	32.39%
Total	189	5,123.93	7,560.00	2,436.07	47.54%

SCENARIO 2 – SPREADING UTILIZATION WITHIN THE EXISTING PRIME SCHEDULING WEEK

IMPACT = MODERATE

General

The objective of this scenario is to study the additional Classroom capacity afforded by spreading utilization within the 24-hour prime scheduling week (9:00 a.m. – 3:00 p.m., Monday – Thursday). This scenario is based on data contained in **Report 1**.

Assumptions

The practice of compacting class offerings into a primetime subset of the standard scheduling week could continue, and utilization could be more evenly spread during primetime. All rooms would be used proportionally. Eighty percent room hour utilization is assumed as a reasonable, sustainable level, resulting in a 19-hour per room usage cap for the 24-hour week.

Comments

The 16 – 25 seat, 26 – 50 seat, and 100+ seat Classrooms appear to be almost out of proportional growth potential during the 24-hour primetime scheduling week. The 100+ seat Classrooms are particularly close to having no further growth potential.

Results

The impact of Scenario 2 is moderate. Although there does appear to be some proportional growth potential in all size categories of Classrooms, UNT is running out of growth potential in all Classrooms with 16 – 50 seats, and with 100 or more seats.

Scenario 2 – Spreading Utilization Within 24-hour Prime Scheduling Week

Main					
Classroom					
Capacity Group	Rooms	Current Room Hours/Week	Cap. Room Hours	Growth Hours	Growth %
1 - 15 Seats	6	31.50	115.20	83.70	265.71%
16 - 25 Seats	12	215.50	230.40	14.90	6.91%
26 - 50 Seats	122	2,199.00	2,342.40	143.40	6.52%
51 - 100 Seats	21	353.50	403.20	49.70	14.06%
100+ Seats	28	521.50	537.60	16.10	3.09%
Total	189	3,321.00	3,628.80	307.80	9.27%

SCENARIO 3 – ANALYZE IMPACT OF CHANGING CLASSROOM CAPACITIESGeneral

The objective of this scenario is to study the impact of the process to change Classroom capacity totals starting in Spring 2013. This scenario has two versions: one based on the 50-hour standard scheduling week (Scenario 3a), and the second based on the 24-hour prime scheduling week (Scenario 3b). This scenario is based on data contained in **Report 1**.

Assumptions

Beginning in Spring 2013, UNT will undergo a process to reduce many of their Classroom capacities, due to incorrect fire code capacity calculations. In the past, UNT has used 15 sq. ft. per person to determine room capacity on their campus. However, higher education facilities are classified by International Building Code as business space, not educational space, which requires an increase to 20 sq. ft. per person occupancy. This recalculation has been applied only to Classrooms with moveable seating, and has been ignored for all Classrooms with fixed seating, as UNT believes such rooms can be reclassified as assembly spaces, to avoid violation of fire code. Note that this recalculation has also resulted in an increase in the smallest Classroom capacities. Because of this, room hours attributed to the 1 – 15 seat Classroom size category in the Fall 2011 schedule were added into the next-highest size category for this scenario. Additionally, two Classrooms falling in the 51 – 100 seat size category that were under renovation during Fall 2011 are now back online, so those Classrooms were also incorporated into this scenario.

Comments

When the Classroom capacity change is complete, Classrooms will retain the ability to increase utilization by at least 28 percent across all size categories, when looking at spreading utilization within the 50-hour standard scheduling week. During the 24-hour primetime, since 17 Classrooms are shifted out of the 26 – 50 seat size category, that tier shows growth constraints. However, those growth constraints can potentially be absorbed for sections currently scheduled in those rooms, whose actual and maximum capacity numbers can be assessed to determine whether they can be moved into a classroom one size category larger or smaller. The largest Classrooms also appear to be approaching the end of their growth potential, although that size category was unchanged by the plan to change Classroom capacities.

Results

Although Classroom capacities will see an overall net reduction of approximately 1,000 seats in Spring 2013 due to fire code regulation compliance, this shift is largely mitigated by an additional two large Classrooms in the inventory, and a capacity increase in the smallest Classrooms. Shifting sections out of the 26 – 50 seat size category to larger or smaller Classrooms during primetime can further alleviate bottlenecks caused by capacity reduction.

Scenario 3a – Spreading Utilization Within 50-hour Standard Week with Changed Classroom Capacities (Parentheses show planned change to room inventory)

Main					
Classroom					
Capacity Group	Rooms	Current Room Hours/Week	Cap. Room Hours	Growth Hours	Growth %
16 - 25 Seats	29 (+17)	397.31	1,160.00	762.69	191.96%
26 - 50 Seats	107 (-15)	3,336.18	4,280.00	943.82	28.29%
51 - 100 Seats	27 (+6)	544.44	1,080.00	535.56	98.37%
100+ Seats	28	846.00	1,120.00	274.00	32.39%
Total	191 (+2)	5,123.93	7,640.00	2,516.07	49.10%

Scenario 3b – Spreading Utilization Within 24-hour Primetime with Changed Classroom Capacities (Parentheses show planned change to room inventory)

Main					
Classroom					
Capacity Group	Rooms	Current Room Hours/Week	Cap. Room Hours	Growth Hours	Growth %
16 - 25 Seats	29 (+17)	247.00	556.80	309.80	125.43%
26 - 50 Seats	107 (-15)	2,199.00	2,054.40	-144.60	-6.58%
51 - 100 Seats	27 (+6)	353.50	518.40	164.90	46.65%
100+ Seats	28	521.50	537.60	16.10	3.09%
Total	191 (+2)	3,321.00	3,667.20	346.20	10.42%

RECOMMENDATIONS

While UNT's room inventory contains several room types, only Classrooms were experiencing a perceived shortage related to class scheduling. It appears that UNT does currently have the potential to manage continued proportional enrollment growth. To achieve this full growth potential without new construction or acquisition, UNT should consider the findings, scenarios and recommendations in this study to create an academic scheduling policy that includes high-impact changes.

Space should never dictate pedagogy. To maximize efficiency and be prepared to handle any future enrollment growth, UNT will need to organize and regulate changes through a scheduling policy. This will minimize the number of changes needed by UNT's scheduling process. Specifically, the mix of new lecture offerings will need to be spread throughout the entire scheduling week and adhere to an approved matrix of standard meeting patterns.

The statistical findings presented in this report highlight the Classroom bottlenecks that exist at UNT and how they are potential roadblocks to the achievement of the stated goals of improved utilization of lecture space and maximum enrollment growth potential. The following recommendations present strategies that can help UNT attain those goals. Specifically, UNT could benefit from the following:

- Development of an academic scheduling policy that spreads class offerings across the entire standard scheduling week, emphasizes equitable use of Classrooms by programs during prime scheduling times and emphasizes scheduling of classes into appropriately sized rooms
- Continued adherence to a policy that requires classes to use standardized meeting blocks
- Continued review of existing room inventory to ensure all rooms are being used to their highest potential

RECOMMENDATION 1 – DEVELOP AN ACADEMIC SCHEDULING POLICY THAT MAXIMIZES ROOM UTILIZATION

General

UNT will need to develop a clear policy that emphasizes spreading Classroom activities across the entire 50-hour standard scheduling week, emphasizes equitable scheduling of those rooms by department or program and promotes scheduling classes into appropriately sized rooms. Such a policy will aid in meeting stated objectives of improved utilization of lecture space, maximum growth potential and limiting the effects of bottlenecks.

Assumptions

UNT's senior administration could support and enforce a policy that will improve utilization of Classrooms, maximize growth potential, and limit the effects of bottlenecks. Past successes in maximizing utilization of Classrooms during the primetime scheduling week could be replicated by spreading utilization more evenly across the standard week.

Comments

Changing long-term scheduling practices based on non-pedagogically determined preferences could make it difficult to change existing scheduling methods, including times when classes are offered. Those practices necessitate that UNT has a data-driven, written scheduling policy that is reinforced by administration. A data-driven policy could include definitions of an equitable share of primetime between programs and/or faculty. This will allow UNT to continue to meet the demands of current and incoming students, and minimize the need for UNT to undergo the expense and inconvenience of a construction project or new space acquisition in the near future.

The process of spreading class hours could be gradual. Trying to mandate major change instantly can lead to resistance that could ultimately hinder the process. Faculty and student availability must be kept in mind when spreading class times to incorporate more “non-prime” hours. It should be considered that full-time faculty members have various demands which may limit their availability throughout the scheduling week. To spread the schedule evenly, both full-time and part-time instructors must be scheduled effectively.

Implementations

UNT could implement a policy that supports maximum utilization and enrollment growth in lecture space. Three main components of such a policy are: 1) Spreading utilization across the standard scheduling week; 2) Emphasizing equitable use of Classroom space by department or program; 3) Assigning rooms based on a best-fit ratio between the enrollment or max enrollment compared to the room's capacity.

- 1. Spreading utilization across the standard scheduling week.** It is not uncommon for an institution to begin to compress most of the activities into a small “primetime” subset of the scheduling week. In UNT's case, this time is 9:00 a.m. – 3:00 p.m., Monday – Thursday. Increasingly, early morning and late afternoon classes are avoided. The real victim, in many cases, is the student. When the 50-hour scheduling week is reduced to a 24-hour primetime week, it may prevent the student from getting all of the classes she/he needs in a conflict-free schedule.

When analyzing **Report 1** and comparing Scenarios 1 and 2, it is evident that the percentage of Classroom utilization is significantly higher during primetime. If class offerings continue to be compacted, Classrooms will continue to be bottlenecked during the prime scheduling week and potentially limit proportional growth.

The following table shows the difference in the utilization of Classroom space between the standard and prime weeks:

Main			
Classroom Utilization			
Scheduling week	Rooms	Room Hours/Week	Room Hour Utilization
50-hour standard	189	5,123.93	54.22%
24-hour primetime	189	3,321.00	73.21%

Primetime packing is also evidenced in the prime ratio, as explained in Finding 2. For example, this ratio shows that roughly 65 percent of all Classroom offerings were packed into primetime hours comprising only 48 percent of the standard week. Spreading the utilization so that the prime ratio is closer to 48 percent during the prime scheduling week would allow for increased growth and reduced bottlenecks.

- 2. Emphasizing equitable use of Classrooms by department during prime scheduling times.** UNT could implement a policy that supports enrollment growth and student satisfaction. The main example covered in the scenarios above is spreading utilization across the entire scheduling week. Enforcement of a policy to spread utilization could include one or more reports (such as **Report 4**) that measure the prime ratio of Classroom activities by subject or department. Maximum prime ratio levels could be established for each subject or department. Violations of such a policy should be the responsibility of the departments to resolve prior to the schedule being completed.

For immediate alleviation of bottlenecks, UNT could consider reducing existing primetime utilization by a fixed percentage by subject/department while reallocating hours. This approach requires UNT to compare the percentage of subject/department usage of bottlenecked rooms during primetime versus its usage of all hours in the schedule (using reports such as **Report 4**). This approach promotes fair allocation while recognizing greater space needs of a larger subject or department. UNT would determine the percentage of effective capacity it needed to make available, and reduce the utilization of each subject or department to an equitable percentage of that reduced number of hours of usage.

- 3. Assigning Classrooms based on a best-fit ratio between the enrollment or max enrollment compared to the room’s capacity.** The inefficient practice of assigning classes to rooms where there is an abundance of unused seats can unnecessarily increase utilization of larger capacity rooms.

The seat fill data based on actual enrollment shown in Finding 5 points to the possibility that some classes are not filling the seats in their rooms to their potential.

Reassessing the number of seats needed could potentially allow classes to be scheduled into smaller rooms.

In conjunction with scheduling based on good seat fill, it is recommended that UNT periodically analyze max enrollment numbers assigned to a course section. Often, room scheduling is done based on max enrollment, prior to determining actual enrollment of a class. If max enrollments are repeatedly much higher than the actual enrollment of certain classes, this can lead to the ongoing scheduling of classes in rooms that are too large.

RECOMMENDATION 2 – CONTINUE TO ENFORCE AN ACADEMIC SCHEDULING POLICY THAT REQUIRES CLASSES TO USE STANDARDIZED MEETING BLOCKS

General

While UNT appears to offer many standardized meeting patterns, it will need to continue to emphasize that classes meet in standard blocks in order to achieve maximum efficiency and student satisfaction.

Assumptions

UNT’s senior administration could support and enforce a policy that increases efficiency and student access to courses by standardizing time blocks.

Comments

The use of standard meeting blocks in a schedule of classes has three main benefits:

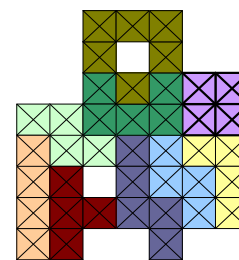
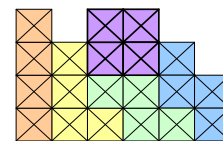
1. **Standardization** – This method offers a repeatable, orderly and scalable solution that is easy for faculty and students to remember.
2. **Efficiency** – Standard meeting patterns “fit” together better in terms of an overall class schedule.
3. **Availability** – Standard meeting patterns reduce the number of potential conflicts for students and faculty.

Implementations

Meeting patterns, or “blocks,” are the foundation of a schedule. For example, UNT offers one-hour classes starting at 9:00 a.m., 10:00 a.m. and 11:00 a.m. on Monday, Wednesday, and Friday. Many colleges and universities allow multiple, non-standard meeting patterns that drastically reduce space utilization. As noted in Finding 7 of this study, UNT has instances of classes meeting in non-standard patterns. Classes that start and end “off the grid” conflict with two or more standard blocks (not just one). This makes it harder to build conflict-free schedules for students, faculty and space, and creates built-in space usage inefficiencies.

The concept of standard meeting blocks and their impact on the academic schedule is best understood by comparing them to Tetris blocks. The object of the popular video game is to pack the blocks neatly into a confined amount of space without any holes or gaps in the overall structure. Because there are a small number of uniquely-shaped blocks, the game is relatively simple to play.

The same holds true for standard course blocks on campus. With a limited number of uniquely-shaped blocks (meeting patterns), it becomes easier to schedule classes effectively into a finite number of buildings and rooms on campus. But as you increase the number of unique meeting patterns, your schedule becomes full of gaps and holes, thus increasing the chances that student schedules are not optimized and forcing students to spend a longer amount of time enrolled at your institution in order to complete their academic coursework.



RECOMMENDATION 3 – SCRUTINIZE THE INVENTORY OF SPACEGeneral

In any situation wherein space is at a premium, it is imperative to scrutinize the existing space inventory closely. Also, when developing data-driven scheduling policies, the accuracy of the data must be confirmed (specifically class enrollments, max enrollments and room capacities).

Assumptions

UNT has a growing and changing room inventory and it is important that all space usage types, equipment and number of seats are coded correctly.

Comments

Maintaining an accurate inventory of space is the most common oversight institutions make in the space management process. Results of surveys, such as this report, can only be as accurate as the existing data allows.

Space needs should be reviewed continually as it relates to the current room inventory. As new space is added, data should be re-analyzed to determine what type of space is at a premium. Equipment and technology needs should also be considered when considering new space additions.

Implementations

UNT could implement a policy to review the room inventory regularly in the following ways: 1) Tour the entire campus to verify the accuracy of room data to ensure that seat capacities and room equipment are noted correctly; 2) Assess the increasing numbers of new students and classes compared to existing room inventory, and make statistically based decisions on the types/sizes of rooms to be acquired or renovated.

CONCLUSION

The availability of appropriate academic space affects the entire UNT community including students, faculty and administration. The data and insights from this study and the related recommendations could help UNT maximize student access to instruction, responsibly utilize resources, and prevent superficial limitations to growth. While it could be politically charged, spreading class offerings over the entire standard scheduling week, emphasizing equitable usage of space during primetime by subject/department, and scheduling classes with a best fit between enrollment and room capacity could be highly effective.

Frequently, it is more difficult to deploy a plan that addresses issues such as those covered in this study than it is to develop that plan. For that reason, a formal academic scheduling policy must be in place to support the plan. The scheduling policy must also be adopted and actively supported by a senior academic administrator and/or faculty representative. Otherwise, campus politics and apprehension to change may hinder the implementation of the policy.