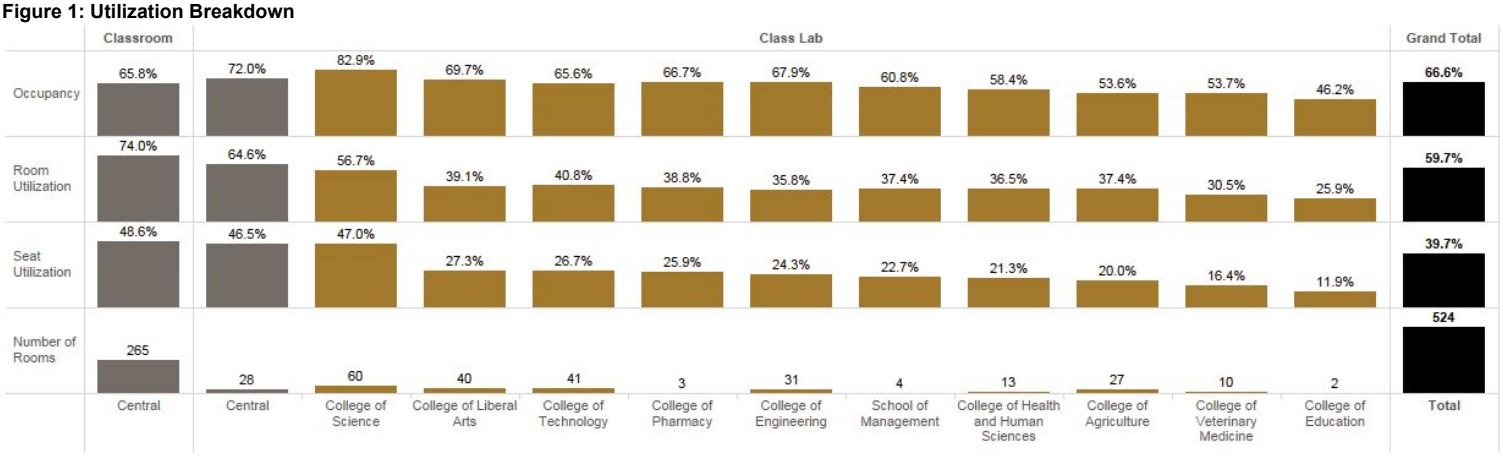
OIRAE Briefing
October 2015

PURDUE UNIVERSITY

Instructional Space Utilization

Strategic planning and in-depth analysis around instructional space is becoming increasingly important as we build innovative classrooms and refine our teaching methodologies through hybrid courses, active pedagogies, and enhanced use of educational technology. This briefing will examine the utilization rates and scheduling distribution of instructional space on the Purdue University campus, using the fall 2014 semester as a case study. The data used in this analysis includes all classrooms and teaching labs that were formally scheduled in Banner during the fall 2014 semester and accounts for approximately 7% of assignable space on the West Lafayette campus. It excludes any other type of room that has been scheduled (such as conference rooms and other spaces not typically used for teaching), any room that has split usage between teaching and non-teaching space, any room with prorated room types, as well as open labs. Instructional space utilization is standardly examined in three ways: Occupancy, Room Utilization, and Seat Utilization as discussed below. While these figures are routinely computed on average for an entire institution, it is also important to understand the necessary variation in the current and optimal values of these metrics across different sized rooms, use cases, and types of space.

Figure 1: Utilization Breakdown



The room utilization for all rooms for fall 2014 was 59.7% (73.1% central rooms and 42.9% academic rooms), which is calculated as the total hours scheduled divided by the possible scheduled hours between 7:30am and 5:30pm Monday through Friday (50). The occupancy is the percent of seats filled when the room is scheduled, and seat utilization is the product of room utilization and occupancy; both are shown in Figure 1 above. Looking at room sizes for centrally controlled classrooms (not including central labs) on the right in Figure 2, the utilization improves with the size of the room. Below in Figure 3, only including classrooms, shows the trend of space utilization along with the number of centrally controlled classrooms utilized over the last 10 years. Notably, it has stayed relatively constant over that time period. While these charts can begin to paint a picture of academic space utilization due to scheduled courses, it does not take into account other academic and student events. These events add 3.4 hours/day of use, on average, per classroom (not included in this analysis).

Figure 2: Centrally Controlled Classroom by Size

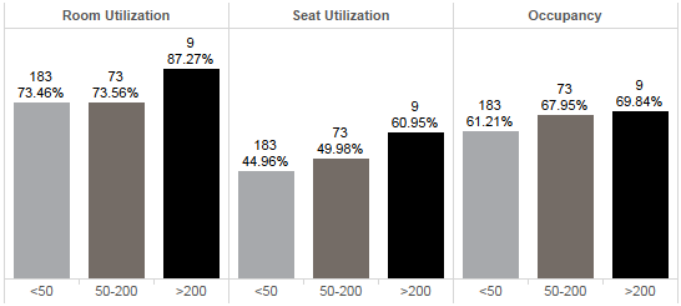
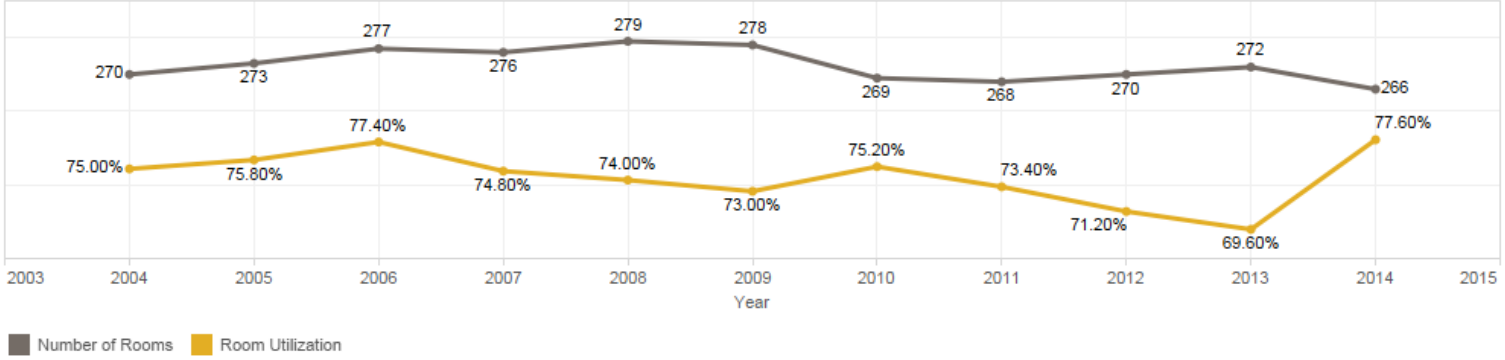


Figure 3: Centrally Controlled Classroom - Historical



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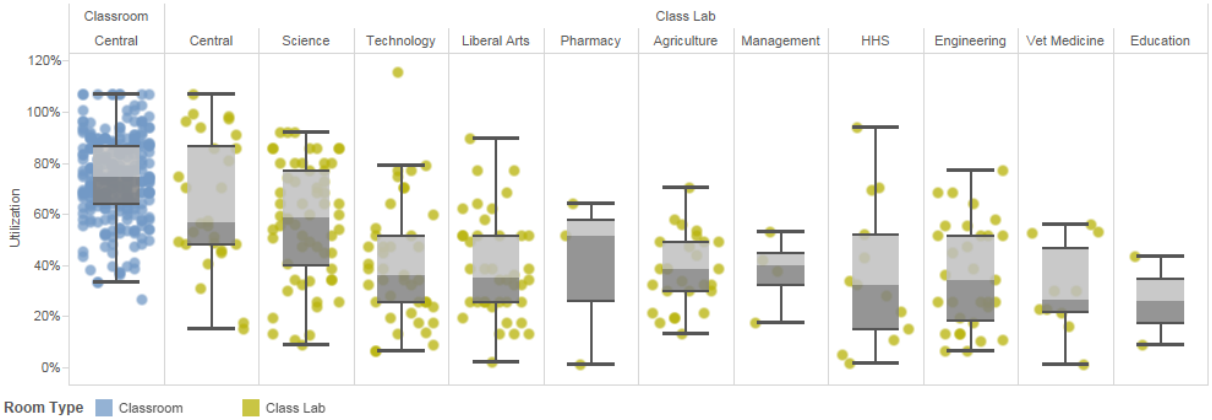
The room utilization of centrally controlled rooms is much higher than in non-centrally controlled space, however, the occupancy rates in every college are more similar to centrally controlled rooms. This indicates that seats are being adequately filled, however, the rate of use is low for non-centrally controlled space, which drives the low seat utilization rate. Central scheduling controls both classrooms and some ITaP labs (separated out below), whereas academic areas control only teaching labs. Examining only the labs below in Figure 4, we see that each college has a different distribution and number of class labs controlled. Centrally controlled labs have the highest utilization, however, they also have a high variance.

Figure 4: Room Utilization - Variance



In Figure 4 above we see that there is a large amount of variance in almost all colleges and this variance persists when we look at classrooms vs labs. There are multiple reasons for the high variance of utilization amongst instructional rooms. For example, a room may have been in a transitional state of “ownership” or undergoing remodeling for part of the fall 2014 semester. This would dramatically lower its utilization for the specific semester. You will notice that some of the rooms have utilization over 100%. Due to the standard metric discussed above, you can see that the facility hours are calculated as the total number of hours in a week that a room is scheduled, but it is only divided by 50 for the number of hours in a standard school week. Because of the way this is calculated, rooms heavily utilized outside of the standard school week get an inflated utilization rate using these standard calculations.

Figure 5: Course Schedule Heatmap

	Mon	Tue	Wed	Thu	Fri
7am	76	84	89	92	87
8am	208	207	262	226	231
9am	305	438	382	447	346
10am	353	438	425	445	379
11am	333	388	381	407	339
12pm	322	457	374	467	325
1pm	342	413	387	419	316
2pm	356	420	409	426	322
3pm	316	419	375	429	283
4pm	278	370	328	381	217
5pm	142	212	164	207	75

Figure 5 to the left shows a heat map of the number of class hours during each time block for the fall 2014 semester. Only courses that use a campus building are counted. It is clear that there are periods of low room utilization during early morning and late afternoon periods. If you only move current classes around, the total room utilization on campus will not change, but it does show there is room to grow in course offerings if we more uniformly utilize all hours of the school day. It also means further analysis could be done to determine if some classroom space could be re-purposed if we had a more balanced schedule.

The Kentucky Council on Postsecondary Education and Paulien & Associates, Inc. conducted a nationwide space utilization survey of public institutions of higher education in 1999[1]. It reported an average desired classroom room utilization of 68% and occupancy of 64%. Purdue’s was 74% and 65.8% respectively. The report had an average desired schedule lab space room utilization of 44% and occupancy of 80%; Purdue’s was 45% and 69.9% respectively in scheduled lab space (note this is combining centrally and academically controlled space). While we are comparable to national standards, an EAB report on Maximizing Space Utilization[2] discussed how over 15 years, Algonquin College set a new standard of 85% room utilization. They were able to increase enrollment by 76% using less classroom space by renovating space and redefining scheduled offering times. As further analysis is done around instructional space at Purdue University, it is important to understand how the different units use the various types of instructional space, what metrics should be measured, and what goals drive those metrics.

[1] http://cpe.ky.gov/NR/rdonlyres/BDD4CF1D-0A9C-44FD-91C7-5773BCC7878E/0/2_SpaceUtilStandards_SpaceNeedsModel_99_2.pdf

[2] https://www.eab.com/research-and-insights/academic-affairs-forum/studies/2010/maximizing-space-utilization