Identifying a Capacity Model for TBR's Community Colleges:

How Have States Approached Capacity in Their Community College Systems?

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Introduction

This literature review examines the need for a capacity formula for the Tennessee Board of Regents (TBR). This review is designed to offer information useful in optimizing the utilization of space across the system's 13 community colleges. In communication with colleagues or representatives from sister institutions, it has become apparent that space utilization and optimization is a serious challenge. The bulk of instructional hours occurs between the time periods of 8:00 am and 2:00 pm (see Table 1). This utilization of space leaves an 8 hour time frame to be realized for usage. According to scheduling estimates and enrollment data at various institutions, TBR community colleges have an opportunity to become more efficient and cost effective operationally. This literature review delves into narrative and discussions about current TBR formulas and the methodologies other states use to determine capacity.

Table 1: Main classroom course times

MWF	8:00	8:55
MWF	9:05	10:00
MWF	10:10	11:05
MWF	11:15	12:10
MWF	12:20	1:15
MWF	1:30	2:25
MWF	2:35	3:30
MW/TR	8:00	9:25
MW/TR	9:35	11:00
MW/TR	11:10	12:35
MW/TR	12:45	2:10

NCES Facility Use

The National Center for Education Statistics (NCES) composed a Working Group on Postsecondary Physical Facilities committee in 1992. The committee contained representatives from NCES and universities and colleges representing many states such as California, Virginia, Massachusetts, New York, North Carolina and Idaho. This committee created a space database inventory in which colleges and universities use to determine capacity. The inventory asks specific questions to accurately allot space and regulate allocation of new space. The questions are:

> ***Question 1***
> *For each type or size of classroom or laboratory, what percentages of the rooms are in use at each hour of the day? How many hours per week are certain rooms in use, and for what purposes? Are there "valleys" in the utilization pattern that could be better scheduled?*
> ***Question 2***
> *For classrooms or laboratories with different numbers of stations, what percentages of the stations are used at each hour? Where might more students be accommodated?*
> ***Question 3***
> *Based on standards or criteria the institution or system wishes to use, how many students (or weekly student contact hours) can be accommodated in the existing physical plant? Does the institution have enough space? Too much? What categories of space are needed to accommodate additional students or program changes?*

The NCES also used the total assignable square footage (ASF) to assess capacity needs and to answer the essential questions listed above. ASF is determined in multiple ways depending on space type and program needs:

1. ASF of specific categories of space per student or program. Categories of space include classroom, laboratory, and study facilities.
2. ASF of research and non-class laboratory space per faculty. This can also relate to research revenues and expenditures.

The NCES provided definitions of building area, building measurements, and coding as well as providing the components of data collection in an effort to encourage a national method to facility inventory assessment. Although the inventory provided practical guidelines for capacity usage, it encouraged a campus-by-campus evaluation of questions and factors listed to best determine facility use.

Problem

Fall 2015 will be the first semester of the Tennessee Promise. In the fall of 2014 there were a reported 58,000 students who had applied for the last dollar scholarship (Tennessean.com). Community colleges and colleges of applied technology across the state are expecting an influx of new students and must be prepared to accommodate the growing numbers.

Schools are beginning to question if they will have the instructional space needed to accommodate a number of students that will continue to grow. An example is the rapid growth at Volunteer State Community College. As of July 20, 2015, FTE is up 19% and headcount is up 8%. Courses are filling fast and sections has been added, but Volunteer State, and other institutions across the state, question if capacity will be an issue in the future as the Tennessee Promise continues to develop and an increase of students are expected to enroll in 2-year institutions over the coming years.

Institutions have often depended on a "we did it before" rationale to analyze if a school can handle rapid growth. The previous trend in growth occurred over 5 years ago. This quick growth stemmed from the weakened economy years ago. During this time, enrollment was the highest it had been in years and schools were able to accommodate the students attending.

Although spikes in enrollment occurred and accommodation was successful, the system requires a more guaranteed method of accounting for available space.

Current Formula

The Tennessee Board of Regents currently uses the Tennessee Higher Education Commission (THEC)'s space allocation guidelines. Campuses use THEC's Space allocation Guidelines Study-Data Input and Calculation Spreadsheet to correctly identify instructional space and capacity. The spreadsheet contains seven categories of space:

1. Classroom
2. Teaching Laboratory and Studio (scheduled)
3. Open Laboratory and Studio (unscheduled)
4. Research
5. Office
6. Library and Information Commons
7. Physical Education and Recreation Space

Each category of space has a set of criteria of utilization. The first is classroom utilization - hours per week. It is assumed that schools operate on an 8:00am – 5:00pm schedule and the typical week has about 30 hours of utilization. The second criterion is percent of seats occupied during scheduled classes. The goal of this criterion is 60% occupancy with recognition that some rooms may have less than this percentage, while others have more. The final criterion is based on the space per seat of the classroom and allows for allocations of seats.

Teaching labs and studio spaces follow the same guidelines as classrooms, although utilization is different because these spaces are used less often. Labs are scheduled for fewer hours than 30 a week and may differ from other scheduled class time.

(See Table 1 for a chart on Classroom category usage at Volunteer State Community College. This table follows the model THEC provided in its Space Allocation Guidelines.)

Table 2: Classroom category usage for Volunteer State Community College

Part I – Classrooms		
Class Size	**# of sections**	**Weekly CR Hours**
1-8	5	12
9-14	42	125
15-20	52	151
21-26	142	415
27-32	84	245
33-47	126	377
48-74		
75-126		
127+		

State utilization = 60% (fixed)		**Hours per week:**	30
Classroom Stations	**NASF / Sta**	**NASF per CR**	**Number of CRs**
12	26	312	1
20	25	500	5
30	21	630	6
40	18	720	14
50	18	900	9
60	18	1,080	13
100	17	1,700	0
150	16	2,400	0
275	14	3,850	0

Other states' formulas

California

Main formula: x = a x 100(b)

a = ASF

b = WSCH

The state of California's community colleges abides by the state's space standards in accordance with the California Code of Regulations. The system was able to create formulas in which capacity is determined. According to cccco.edu's Chancellor's report, "Enrollment is divided by programs and translated into 'weekly student contact hours' (WSCH) -- the average number of hours of student instruction conducted in a week in a primary term of an academic year. Space is defined in terms of 'assignable square feet' (ASF). It is inventoried by room and categorized according to taxonomy of programs. Capacity is then defined by these space standards -- a number of ASF per 100 WSCH."

Although formulas are used for the WSCH and the ASF, they must be analyzed by each institution's distinction in space. These distinctions can include classroom, laboratory, office, library and audio visual/television space. The standards are used to determine if there is an overall need for the space or if the need can be satisfied with use of another space.

Florida

Main formula: $x = a \; x \; b$

A = number of occupants

B = square feet per occupant

Florida community colleges follow the same guidelines as school boards and university boards of trustees when analyzing space and occupancy criteria. The criteria are referred to as the "Size of Space and Occupant Design Criteria". It consists of an Information Classification Code (ICS) that is used to identify programs that will use the space or activities that may occur in each given space.

Calculations of facility spaces mostly use a number of occupants multiplied by the square feet per occupant to determine the space size. These calculations are most often used in non-core curricula classroom spaces. Calculations differ in core curricula facilities and are determined by classroom type. Florida recommends an amount of 34% net square footage difference for community colleges.

Georgia

Main formula: $x = \frac{a}{40(b)}$

$A = WSCH$

$B = station\ count$

The Technical College System of Georgia houses the state's technical colleges. Georgia differs from other university and community college systems. Georgia's technical associate degrees are acquired from the state's two-year technical colleges. Associate of Arts, Associate of Science and Associate of Applied Science are acquired from four-year institutions. This presents a great difference in capacity models for two year associate degrees. The capacity of four year universities and colleges must be considered in the calculation of students pursuing AA, AS and A.A. S. degrees.

In the University of Georgia's strategic plan for 2013 -2018, USG stated a goal to "build fewer new buildings and invest in repurposing current facilities". USG has determined to look closer at facility usage and data supporting its use. Space allocation is divided into six key types: classroom, lab, and office, library, special and general. USG's previous target focused on 25 hours per week and 65% occupancy in classrooms. The system has redesigned its goals and has

decided to become more aggressive in usage goals. New classroom goals focus on analyzing utilization 24/7 and 40 hours a week with 100% seat occupancy. The new model also captures two important concepts of utilization: weekly room hours (WRH) and the fit between range of sizes of rooms and range of enrollment of the courses. From the new concepts a formula has derived: WSCH/ (station count x 40). WSCH is the weekly hours times the course enrollment.

Although Georgia has taken a new aggressive model on effectiveness of classroom use, it is understood that such an aggressive model is neither easy nor convenient. It is also understood that space utilization differs from institution to institution and can even differ from building to building on the same campus.

North Carolina

Main formula: $x = \frac{a\ xb}{c}$

A. *The number of students that are enrolled in a course after the drop-add date*
B. *The number of hours a student must have for the course/lab*
C. *The amount of hours the lab is open*

The state of North Carolina uses a Utilization File reporting to determine capacity. The current formula is comprised of the three elements listed above. Using the three elements the formula A multiplied by B and then divided by C is used. The course is then broken down into the class listings offered in the room and they are able to receive an accurate number of the room use and student clock hours.

There are exceptions to the Utilization File calculation. This includes classes not held in buildings owned by the schools, independent courses, internships, practicums, and cancelled

courses. Physical education courses do not use the formula unless the class uses a scheduled indoor room. If an indoor room is used, the utilization file will be used. Also, courses that are "TBAs" or informal and/or irregular meeting courses (such as music, theater) would not count as well.

Texas

Main formulas: $x = \sqrt[a]{300}$ *and* $x = \sqrt[b]{15}$

A = Contact hours

B = Semester hours

The Texas Higher Education Coordinating Board oversees the expansive community college system of Texas. THECB has developed the "Space Planning Model" to accurately assess space needs of all their higher education public institutions. It is used to assure the spaces used address the school's unique program and needs.

Capacity is determined by the full-time-student equivalent (FTSE). The FSTE is calculated by dividing contact hours by 300 and dividing semester hours by 15. Spaces are divided into 5 categories: teaching space, library space, research space, office space and support space. Teaching space can include laboratories, exhibition rooms, lounges and assembly rooms.

Virginia

No main formula. (See Table 3 below).

The Virginia Community College System follows the guidelines of the State Council of Higher Education for Virginia. The SCHEV states, "The need for Educational and General Space

under the SCHEV guidelines is primarily determined by regular session on-campus enrollment." Utilization is also important in determining space needs in Virginia Community Colleges. Utilization is divided into two categories of classrooms and class labs. Table 2 demonstrates Virginia's utilization guidelines.

The SCHEV requires a detailed room-by-room inventory of all space from each school and keeps this information in their database. They also receive detailed enrollment figures and are responsible for enrollment projections. Every scheduled instructional activity is documented to SCHEV. Capturing this specific data allows the council to make more efficient choices when making decisions on new facilities and spaces. (See Table 3 for distinction of classroom vs class lab use.)

Table 3: VA classroom vs lab usage

Classrooms	Class Labs
• Average 40 hours of room use per week	• Average 24 hours of room use per week
• Average 60% occupancy while room is in use	• Average 75% occupancy while room is in use
• Average 24 hours of station use per week	• Average 18 hours of station use per week

Conclusion

The six states studied in this project contained many common variables within their formulas. Common variables across the states were weekly student contact hours, assigned square footage and square foot per occupant. States also used categories or room types to distinguish the types of instructional spaces. Although common variables existed across the six states, each state presented specific formulas that matched their North Carolina presented the most efficient and concise formula of all the sampled states. While the formula proved to be the

easiest, it does not denote it is the correct fit for TBR community colleges as well. Many state system's formulas contained exceptions, additions or additional regulations for differing programs and courses. Another important difference that should be noted is population distinction in states such as California and Texas. They comprise a much larger student enrollment and have a diversified population that differs from Tennessee's.

The six states hold unique governing boards that can range from local boards to state elected boards. Each difference can affect the states' approach to facility issues and changes. Tennessee is faced with a very different challenge than in other state in its newly developed Tennessee Promise. The Promise makes Tennessee unlike any other state as it will likely see a surge student enrollment rapidly that will challenge space allocation throughout the state.

The Tennessee Promise increases the likelihood of space modification and exceptions to current formulas. Given the distinctive variables that the Promise adds to space allocation, further study in the increase of enrollment as an effect of the program and the retention of students over the first few years would need to be evaluated before adapting a new state formula.

References

California Community Colleges (1998). *Facilities Planning Manual for the California Community College.* Retrieved from extranet.cccco.edu.

Gregory, David. Personal Meeting. 31 March 2015.

Miles, John. (2011). *Space Facilities Inventory Annual Report.* Retrieved from http://www.dms.myflorida.com.

Office of Fiscal Services Virginia Community College System. (2012, June 30). *Audited Financial Report for Year Ended June 30, 2012.* Retrieved from https: www.vccs.edu.

Sasaki Associates. (2013) The University System of Georgia Space Utilization Initiative. Retrieved from **: http://issuu.com/sasakiassociates/docs/usg_spaceutilizationinitiative_july**

SCHEV Fixed Assets Guidelines. (2007, September 17). Retrieved June 16, 2015State of North Carolina Higher Education Comprehensive Planning Program. (October 2009) *Facilities Inventory and Utilization Manual, 6th Edition.* Retrieved from https://www.northcarolina.edu

Tamburin, Adam. (2015 May 31). 20K plan to use TN Promise at community, technical colleges. *The Tennessean. Retrieved from http:// www.Tennessean.com*

Texas Higher Education Coordinating Board. (Fall 2014) *REPORTING and PROCEDURES MANUAL Texas for Community, Technical, and State Colleges.* Retrieved from http://www.thecb.state.tx.us

"THECB - Home." *THECB - Home*. National Center for Higher Education Management System, 8 June 2012. Web. 24 July 2015.