Like Nobody’s Business

An Insider’s Guide to How US University Finances Really Work

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6. Academic Affairs

6.1 What does a college budget include?

Colleges are even more varied than the universities in which they exist. A broad Arts and Sciences college at an R1 university may contain two or three dozen departments with many hundreds of faculty members, while a small professional school (e.g., Nursing, Law) at the same university may have only two or three dozen full-time faculty members and no department structure. Furthermore, an entire M3 university or baccalaureate college may be the equivalent of a single college at an R1 institution.

I’ve created an example high-level annual college budget that could represent a modestly sized R1 college or a large college at a smaller institution (Table 6.1), in which the precise numbers are less important than the budget components that they illustrate. For professional schools, say in Law or the health professions, that have more financial autonomy and often no undergraduate program, it is simple enough to modify the estimates accordingly. Let’s examine the example in detail, starting on line 1 with the revenue section. I’ve specified undergraduate and graduate net tuition as if they were calculated in a responsibility centered management (RCM) or activity-based budget environment. As explained in Section 6.2, that approach is merely a way to allocate a share of revenue based on activity, and these two sources would simply be allocated from the central university budget in a traditional (incremental) budget environment. We’ll assume that the college teaches 25,000 undergraduate student credit hours (SCH) to all students, including general education and classes taken by students majoring in other colleges, a typical class being three credit hours per student. We’ll also assume that the college receives $300 per credit hour for a total of $7.5M. In addition, we’ll assume the college has 2,000 majors in its degree programs and that the college receives $1,250 per major for a total of $2.5M. These two amounts together make up the $10M undergraduate net tuition revenue (line 2). The university pools all tuition revenue and subtracts financial aid before allocating revenue to the colleges as a net amount. The calculation is similar for graduate programs; we’ll assume 7,000 graduate SCH at $300 too, which generates $2.1M, plus 1,200 graduate majors also at $1,250 that generates $1.5M. Those two amounts total $3.6M and although that number is already net of any central financial aid
as for undergraduates, individual graduate programs often award tuition waivers as part of recruiting. We must subtract those locally-awarded waivers, which we’ll assume amount to $0.6M, leaving a net graduate revenue of $3M (line 3).

Table 6.1. Example annual college budget, showing major categories of revenues and expenditures, including shares of revenue and institutional costs. See text for explanations.

<table>
<thead>
<tr>
<th>Line</th>
<th>Item</th>
<th>Detail</th>
<th>Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Revenues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Undergraduate Net Tuition</td>
<td>Undergraduate revenue, net of central aid*</td>
<td>10,000,000</td>
</tr>
<tr>
<td>3.</td>
<td>Graduate Net Tuition</td>
<td>Graduate revenue, net of central and local aid**</td>
<td>3,000,000</td>
</tr>
<tr>
<td>4.</td>
<td>Fees</td>
<td>Program and course-specific fees</td>
<td>500,000</td>
</tr>
<tr>
<td>5.</td>
<td>Research (F&amp;A)</td>
<td>Indirect cost recovery from grants***</td>
<td>1,000,000</td>
</tr>
<tr>
<td>6.</td>
<td>TOTAL Teaching &amp; Research</td>
<td></td>
<td>14,500,000</td>
</tr>
<tr>
<td>7.</td>
<td>Institutional Allocation</td>
<td>University revenues, e.g., state, investments</td>
<td>5,000,000</td>
</tr>
<tr>
<td>8.</td>
<td>Philanthropy</td>
<td>Endowment income and gifts</td>
<td>1,000,000</td>
</tr>
<tr>
<td>9.</td>
<td>TOTAL REVENUES</td>
<td></td>
<td>20,500,000</td>
</tr>
<tr>
<td>10.</td>
<td>Expenditures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Facilities Share</td>
<td>60,000 ft² @ $25 per ft²</td>
<td>1,500,000</td>
</tr>
<tr>
<td>12.</td>
<td>Support Units Share</td>
<td>35% of Teaching &amp; Research</td>
<td>5,075,000</td>
</tr>
<tr>
<td>13.</td>
<td>Central Investment Share</td>
<td>3% of Teaching &amp; Research</td>
<td>435,000</td>
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<tr>
<td>14.</td>
<td>TOTAL Support Cost Share</td>
<td></td>
<td>7,010,000</td>
</tr>
<tr>
<td>15.</td>
<td>Salaries—Faculty</td>
<td>70 @ $80,000 per year average</td>
<td>5,600,000</td>
</tr>
<tr>
<td>16.</td>
<td>Salaries—Staff</td>
<td>15 @ $50,000 per year average</td>
<td>750,000</td>
</tr>
<tr>
<td>17.</td>
<td>Teaching Assistants</td>
<td>80 @ $30,000 per 0.5 FTE per year</td>
<td>2,400,000</td>
</tr>
<tr>
<td>18.</td>
<td>TOTAL Salaries</td>
<td></td>
<td>8,750,000</td>
</tr>
<tr>
<td>19.</td>
<td>Fringe Benefits</td>
<td>36% of Total Salaries</td>
<td>3,150,000</td>
</tr>
<tr>
<td>20.</td>
<td>TOTAL Personnel</td>
<td></td>
<td>11,900,000</td>
</tr>
<tr>
<td>21.</td>
<td>Operations</td>
<td>Office supplies, lab equipment, travel, etc.</td>
<td>1,500,000</td>
</tr>
<tr>
<td>22.</td>
<td>TOTAL Operational Budget</td>
<td></td>
<td>13,400,000</td>
</tr>
<tr>
<td>23.</td>
<td>TOTAL EXPENDITURES</td>
<td></td>
<td>20,410,000</td>
</tr>
<tr>
<td>24.</td>
<td>Net Revenues-Expenditures</td>
<td></td>
<td>90,000</td>
</tr>
</tbody>
</table>

*Undergraduate activity: 25,000 student credit hours @ $300 = $7.5M; 2,000 majors @ $1,250 = $2.5M; total = $10M

**Graduate activity: 7,000 student credit hours @ $300 = $2.1M; 1,200 majors @ $1,250 = $1.5M; less $0.6M local aid (tuition waivers); total = $3M

***Research grant revenues: $1M of indirect cost recovery for use of facilities and administration @ 50% of $2M in direct grant costs; grant total = $3M
The college also receives fee income to cover special program and class-specific costs not covered by regular tuition that we’ll assume is $0.5M (line 4). For research income, the direct costs are restricted funds that are budgeted separately but indirect cost recovery contributes back to the regular budget. Thus, if we assume gross revenue from research grants of $3M, $2M of that would be direct costs involved in carrying out the research (researcher time, equipment, supplies) and $1M would reimburse the university for associated facilities and administration costs (space, accounting services, compliance, etc.) assuming a 50% indirect cost rate. The college receives the $1M as revenue here (line 5) but will use it to pay its share of those costs when we get to expenditures. All teaching and research revenues thus total $14.5M (line 6).

Most colleges require an institutional allocation beyond teaching and research revenue to cover all costs, assumed as $5M in this example (line 7). This amount would typically come from state appropriations and/or investment and endowment income depending on whether this was a public or private institution. The final revenue item is income from philanthropy, assumed to be $1M (line 8). These are restricted funds, but typically a portion is directed towards endowed chairs and program support; increasingly such funds effectively add to the operational budget. All revenues for our example college total $20.5M (line 9).

Moving on to the expenditures section (line 10), we’ll again specify the first few items in an RCM context. These support costs (lines 11, 12 and 13) reflect the college’s share of space and central administrative support units. In an incremental budget the college would not see these items and they would be subtracted from tuition and institutional revenues before allocations were made. The college’s share of all facilities costs (construction bond payments, maintenance, etc.) is computed as the share of space it uses, here assumed to be 60,000 net assignable square feet at an assumed rate of $25 per square foot for a total of $1.5M (line 11). The college’s share of all non-college support unit costs is slightly over $5M at an assumed rate of 35% (line 12). For simplicity I’ve used a simple flat rate based on total teaching and research revenues, but in practice this would likely be a combination of different rates on undergraduate, graduate and research activity. The college’s contribution to the central fund used for reinvestment back into the colleges is a little under $0.5M at an assumed rate of 3%, again levied as a flat rate on all teaching and research revenue for simplicity in this example (line 13). The college’s combined support cost share totals slightly over $7M (line 14).

Personnel costs include salaries and stipends and associated fringe benefits. Our example college has 70 FTE faculty members with an assumed average salary of $80,000 across a mix of all faculty ranks, for a total of $5.6M (line 15). There are 15 support staff at $50,000 average salary, totaling $0.75M (line 16). The stipends for 80 0.5 FTE graduate teaching assistants, at an assumed $30,000 each, come to $2.4M (line 17). Together, employee pay totals $8.75M (line 18) to which we add fringe benefits
at an assumed rate of 36% to get a bit over $3M (line 19), with total personnel costs thus amounting to $11.9M (line 20). The fringe benefit rate is also a simplification for sake of example, as different position types may have different associated rates, and even more simplistically I’ve assumed that it includes tuition for graduate assistants here too. The final budget item covers all other costs of operations such as classroom and teaching materials, office supplies, equipment maintenance, travel and so on, and I’ve assumed a value of $1.5M for all operations (line 21). The total operational base budget combines personnel and operations costs for a total of $13.4M (line 22). When added to the support cost share, total expenditures slightly exceed $20.4M (line 23), leaving a small net remainder from overall revenue (line 24).

This example includes the major parts of a college budget and although it glosses over umpteen minor items, the main point is to provide a relative sense of the components and how they might interact. For instance, to add one additional assistant professor at $73,000 salary will require about $100,000 including benefits on a sustained annual basis. That expenditure is the equivalent of an additional 460 SCH (333 SCH plus a further 127 SCH to cover the combined 38% support cost share) and it assumes there is a spare office for the new person, otherwise the extra space and facilities cost will be $2,500 for a 100 square foot office. That 460 SCH represents 153 class seats using 3-credits per class, which at 30 credits per year is about 5 net new students. The point about them being net new is critical—if they simply move internally then that doesn’t produce new revenue for the institution. Alternatively, increasing the endowment by about $2M would produce revenue of about $100,000 annually, and it could be used to offset funds to retain some star professors through endowed chairs, thereby freeing up funds for a new assistant professor. Not surprisingly, there are multiple combinations and, in practice, there are many efforts going on simultaneously to grow revenue and control expenditures.

A final thought on academic unit budgets: because departments represent disciplines and fields, they are the fundamental organizational units. However, a generic example department budget isn’t especially useful because each department has a unique institutional context and a cost structure that varies by discipline. Still, one can think of a department budget as a smaller version of a college budget. A college such as the one in this example might have five or so departments, some small and some large, and the college budget would be allocated among them and the dean’s office. So, adjusting this budget and dividing everything by five or ten would provide a generic department budget. However, the challenge with smaller units like departments is that they individually have constrained revenue and expenditure portfolios; therefore, they may need to receive or supply cross-subsidies within the college, requiring careful judgment and management by the dean.
6.2 What is RCM or activity-based budgeting?

One of the biggest changes in university budgeting in recent decades has been the increasingly widespread adoption of a budget model that distributes responsibility for managing revenues and expenditures. Such an approach is known variously as Responsibility Center Management (RCM), Responsibility Centered Management, or more generally as Activity-Based Budgeting (ABB). Compared to the other prevalent model, incremental budgeting, RCM is a fundamentally different approach for major subunits of the university, particularly schools and colleges, to manage how they generate and spend resources. There are articles and whole books on RCM (Kosten and Lovell 2011; Curry et al. 2013) and its implementation, something I led at my institution, and from which I learned a great deal about many of the topics in this book. As with all the topics we are covering, I provide simply the essence of RCM here.

RCM adoptions are a response to the “hat-in-hand” approach of incremental budgeting. In that traditional model, units request an increase in their budgets for the following year, based on current needs and new initiatives, from central administration. Under RCM, the dean is given responsibility for all budgetary aspects of the college (hence the term "Responsibility Center"), not only for generating the revenues but also for managing costs effectively. Neither of these is a feature of incremental budgeting. It is not surprising, then, that the rise in RCM budgeting has echoed the trend toward increasing tuition-dependency.

RCM has evolved over the last several decades, so that a recent RCM model can differ in key ways from older implementations (interestingly, with a greater role for central administration management) as institutions learn from each other and adapt the approach to suit their own situations. RCM’s roots lie in the budget models of some of the oldest private universities, where each school or college had an independent budget in the federation making up the university, with “every tub on its own bottom” (or ETOB) as the saying at Harvard goes. If ETOB is at one end of the spectrum and government agency-like central budget control is at the other, proponents of contemporary RCM aim for it to combine the best of both worlds somewhere in the middle. However, RCM evolved from the ETOB end of the spectrum (mostly at the privates) many decades ago. It has only seen broader implementation at the publics since the 1990s and into the 2000s and 2010s. Given its varied history, when a university is considering RCM as a new budget model, critiques may be raised based on perceptions of older ETOB-like models. For example, under classic ETOB a college could theoretically go out of business with little opportunity for intervention from the rest of the university. In contrast, contemporary RCM is built around the concept of subventions (cross-subsidies) in the institutional budget, such that academic priorities are supported by a shared mix of higher- and lower-revenue units and activities.

At the unit (college) level, the change in thinking relative to incremental budgeting is that the base budget no longer arrives automatically each year—if unit activity
rises relative to others then the unit’s share of the overall budget rises too (and vice-versa!). Under either budget system, it is a convenient local fiction that a base budget is semi-permanent—as we’ve seen in many of the preceding sections, the institutional revenues behind those budgets have been changeable, but they aren’t consistently felt locally. Under RCM, colleges sense more closely both the opportunity and precariousness in institutional budgeting that before was largely the concern of senior central administration. Under incremental budgeting, the focus is typically more on academic priorities rather than their revenue or cost dimensions. These differences are at the heart of critiques of both systems.

Figure 6.1 illustrates RCM as compared to incremental budgeting, in a nutshell. Under RCM, colleges (responsibility centers) receive their share of campus revenues as well as their share of costs. Many of those institutional costs (e.g., space and facilities) are invisible to colleges under incremental budgeting, but under RCM the college sees the cost and is provided the (previously invisible) budget to pay for those costs. Notice that colleges likewise see and pay for the costs of central support units (student affairs, human resources, etc.) that were also previously invisible. The net effect of these changes on a college budget is zero in dollar terms, but significant in terms of perception.

Under the incremental model, a college that taught more (or less) than it did the previous year would not necessarily see the change in marginal revenue, whereas under RCM it would see the related revenue increase (or decrease) as well as the associated costs. In RCM, the revenue-generating activity of all colleges is tracked using simple metrics (e.g., total credit hours, enrolled majors, sponsored project revenue) and revenue is allocated by each college’s share of the total activity. Costs are allocated based on share of space occupied for facilities and via a proportional share of support unit costs. These costs are often called taxes, and one of the most important taxes is a contribution to a strategic investment fund that is managed centrally and is available to fund new initiatives.

It is worth underlining that RCM itself doesn’t “make” any decisions, it is merely another way of getting to a budget allocation. It provides latitude for central control and management through subventions and strategic investments while prioritizing a decentralized approach that ideally enables greater entrepreneurial activity by the units. Because the activity formulas and metrics are well-known, RCM proponents claim that it is more transparent and predictable than the incremental model. Still, a well-run incremental budget system with comparable levels of communication can be transparent and effective at stimulating innovation too. In practice, neither is perfect: both have many positive attributes as well as unintended consequences and perverse incentives that require active management for the system to work well.

RCM is structured to incentivize and optimize revenue generation and cost-effective practices. In doing so, it places increased authority and accountability on the deans and vice presidents. While RCM proper operates at the college level,
it relies upon clear communication between colleges and their departments for it to succeed—faculty must understand the within-college budget model so that they can connect their innovations and adaptations with college incentives. It is not unusual for communication to be oversimplified at this level, resulting in a “dollars for butts in seats” mentality that is hard to counteract. Furthermore, because universities are necessarily academically decentralized, many important decisions with financial implications are made at the department level. Yet, RCM is not designed to be a department funding mechanism—that model must be able to handle a relatively higher variance in subventions within and across departments because their budgets are not sufficiently diverse or large enough to absorb “noisy” fluctuations. Thus, the dean must balance academic priorities with budget trends while providing short-term budget stability. This is the reason that RCM is primarily used at larger universities, where the responsibility centers (colleges) have enough varied programs that they can manage year-to-year swings in the budgets across their internal units (departments).

While RCM is often implemented in response to the perceived shortcomings of incremental budgeting (e.g., no incentives to cut costs, dollars don’t necessarily follow teaching activity), RCM is not a panacea and it doesn’t print money. RCM can lead to an everyone-for-themselves attitude, with units competing over the size of their slice of the pie because they have less control over growing the whole pie (for example, colleges poaching enrollments from each other instead of attracting new students to the university). The core notion of a well-implemented RCM budget system is that it should incentivize rapid local responses to opportunities and challenges that together
benefit the institution, by aligning the locus of revenue and cost decisions with the
locus of academic decisions. In practice, as I’ve mentioned, both incremental and RCM
approaches are messy and imperfect, requiring many complicated adjustments to fit
them to a complicated institution. One thing both systems have in common: campus
units will gripe about their budgets either way because there are winners and losers
under both, and because there is never enough money to support and grow the size
and quality of every campus program (see Bowen’s Law in Section 3.7).

6.3 What is the cost of producing a degree?

It turns out that this simple question is devilishly hard to answer accurately. The reason
is that we don’t account for activities in a way that makes it easy to answer. We can
indeed calculate useful institution-wide figures summed across all levels of degrees
and all disciplines, but the minute we want to examine the cost of producing just
bachelor’s degrees, PhD degrees, MD degrees, etc. or the cost of producing degrees
in Economics, Engineering or English, we run into all kinds of issues. Let’s look at the
institution-wide numbers first before unpacking them in the next couple of sections.

We discussed E&R (education and related) expenditures, the subset of all
expenditures related to delivering and supporting instruction, in Chapter 3. In particular,
we looked at E&R expenditures per student FTE in Sections 3.3 and 3.4, which is a useful
way to compare investments per input. For investments per output we calculate E&R per
degree awarded instead (Figure 6.2). By this measure of institutional cost of education
per degree we see many of the same patterns as we did with the per-FTE calculation:
the privates spend about twice as much per degree than do the publics, with the private
baccalaureate and R1 institutions spending $150,000 to almost $250,000 per degree, as
compared to other schools spending $60,000 to $100,000 per degree in recent years.

It’s tempting to mentally divide by four to obtain an annual cost, but it’s not that
simple. These amounts include all levels of degrees, undergraduate, professional and
graduate, each with a different typical time-to-degree. Many undergraduates don’t
finish in four years (and others transfer away or don’t complete), master’s degrees take
two years or less, a PhD can take six-plus years, and their relative proportions differ
by institution. Therefore, the E&R cost per FTE metric analyzed in Chapter 3 is better
suited to obtaining an annual amount. We can also see that research universities have
a higher cost structure than the other institutions, an important part of that being the
relative mix of faculty workload. Nevertheless, E&R spending per degree is widely
used as a cost-of-production metric to benchmark output efficiency in an economic
sense, and it is also useful to analyze trends. In the data underlying Figure 6.2, from
FY1987–2009 the annualized growth rate in cost-per-degree across public institutions
was 0.7% (aligning with labor cost, see Section 3.7) and a striking 3.1% across private
institutions. Post-recession, from FY2009–2017 the two rates were both modest at 0.6%
and 0.5% respectively.
6.4 How does the cost of degree production vary by discipline?

Systematic national data on discipline-specific costs are not widely available, in part because disaggregated department-level data on teaching workloads, salaries, etc. would risk revealing individual personal information. The National Study of Instructional Costs and Productivity, known as the Delaware Cost Study, was initiated by a consortium of institutions in the 1990s to collect such data voluntarily for internal benchmarking by participants, and it now includes hundreds of four-year public and private institutions (Higher Education Consortia 2019).

Fortunately, a recent study has provided the first wide-ranging analysis of program-level costs based on those data (Hemelt et al. 2018). The authors used sophisticated modeling to analyze the relative effects of class size, instructor salary, workload, and non-personnel expenses as key drivers of cost differences by discipline. For ease of understanding, I have converted the results from natural log form into percentage form, showing cost per SCH relative to English for 20 fields for each of the four drivers and as an overall net difference (Figure 6.3). There are wide ranges in the differences across fields, overall and in the component drivers, especially salary and class size. Note that average salary in a department is a function not only of the disciplinary market-based salary but also the mix of faculty types (tenure-track, contingent, teaching assistants). Also, the average class size in a department depends on the mix of lower-division undergraduate classes versus typically smaller upper-division and
graduate classes. Departments that provide introductory or fundamental classes to students across the university, such as Mathematics or English, have a different average class size to those that focus more exclusively on professional or graduate education. Overall, engineering and nursing degrees are relatively costly (roughly double the cost of English degrees), while education and fine arts with small salary effects are still 30–40% more expensive because of class size. Business and accounting are interesting cases because, although salaries are relatively high, the effect of class size lowers their overall cost. At the other end of the scale, disciplines such as psychology, sociology, philosophy and mathematics are less costly primarily because of their average (mix of) class sizes. While faculty workload (class sections per faculty member per year) is a contributing factor in some disciplines, its overall effect is not large, while non-personnel costs (e.g., equipment) are relatively unimportant overall. The study found these results to hold across all institution types meaning, for example, that psychology is consistently less expensive than physics whether at an R1 public university or a private baccalaureate college (Hemelt et al. 2018).

![Graph showing instructional expenditures per student credit hour (SCH) by field of study, expressed relative to English for four cost drivers and the net overall difference, using 2013–2015 data from the Delaware Cost Study. Data are converted to percentages from the original modeled natural log cost differences. Source: Hemelt et al. (2018).]

6.5 Do the humanities cross-subsidize the STEM fields?

This is a loaded question for two reasons, one because there are several layers of answer, and two, because it is an attention-grabbing ringer for the broader question of whether different fields cross-subsidize each other across the university. To the latter, yes,
unequivocally, cross-subsidies exist in almost every university and for good reason: not doing so would undermine academic priorities that enable students to select and combine classes from multiple fields and to change majors if necessary, without worrying about cost. There has nonetheless been a longstanding practice of adding what are essentially surcharges for some fields that are more expensive or where the market (i.e., anticipated future earnings such as for an MBA) will support a higher quality program. But importantly, cross-subsidies and surcharges at the department or program level are not the whole story as they still don’t cover the full cost: the bigger truth is that virtually all programs are subsidized.

Let’s return to the original question about humanities and STEM and use it as a worked example to understand the various layers of this answer (Table 6.2). Fundamentally, as we saw in Section 6.4, because many humanities fields (e.g., English, history, philosophy, and many languages) have modest salaries and can be offered effectively at a moderate class size, on average they are less expensive to operate than most science and technical fields (e.g., physics, engineering) that have relatively higher salaries, smaller classes and/or lower teaching loads (Figure 6.3). But recall that mathematics, the “M” in STEM, is among the least expensive disciplines to teach. Those direct instructional costs per SCH by discipline are approximated from the study mentioned previously (Hemelt et al. 2018) and they are the starting point in our example (Table 6.2, line 1). You’ll see that they range from $165 per SCH for mathematics to $400 per SCH for an engineering program, with an overall average of slightly under $240 per SCH. So, as a layer-one answer, the underlying direct instructional costs of the humanities are lower than in STEM on average, but it is important to keep in mind that the disciplines in each group have a mix of cost structures and the groups are not monolithic. Now we assume a net tuition amount of $350 per SCH (line 2), which as a guide is $10,500 per year based on

<table>
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<tr>
<th>Line Item</th>
<th>Humanities</th>
<th>STEM</th>
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</thead>
<tbody>
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<td></td>
<td>English</td>
<td>History</td>
</tr>
<tr>
<td>1. Direct Instructional Cost</td>
<td>(200)</td>
<td>(190)</td>
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<tr>
<td>3. Differential Tuition/Fees</td>
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<td>-</td>
</tr>
<tr>
<td>4. SUBTOTAL</td>
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<td>160</td>
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<tr>
<td>5. Indirect Support Cost</td>
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<td>(240)</td>
</tr>
<tr>
<td>6. OVERALL TOTAL</td>
<td>(90)</td>
<td>(80)</td>
</tr>
</tbody>
</table>

Table 6.2. Example of the layers of cross-subsidization across disciplines. Amounts are in dollars per student credit hour (SCH).
a standard 30 SCH load for a full-time student, representative of a public institution. We also include differential tuition for the Engineering program at $50 per SCH (line 3), which equates to $1,500 per year on top of base tuition. Our initial subtotals (line 4) show the humanities disciplines generating positive margins of $150 to $170 per SCH, whereas physics generates $65 per SCH, engineering breaks even and generates zero, and math produces $185 per SCH. Many arguments about cross-subsidies will focus solely on the disciplinary cost data as a layer-one answer or will use these offset-by-revenue subtotals as a layer-two answer.

As I’ve intimated above and explained earlier in this chapter, our example so far is incomplete because it does not include all costs related to education. We mustn’t forget the indirect instruction-related costs of academic support, student support and institutional support, that together form the “R” in E&R (education and related) expenditures. From Chapter 3 and elsewhere we know that those are roughly equivalent to instructional costs, so we’ll include them as a flat rate of $240 per SCH across all disciplines (line 5). The resulting overall total (line 6) shows the fully-costed picture: all fields generate negative margins and they are all subsidized from other institutional funds (e.g., state funding at the publics or investment income at the privates). So, the layer-three answer to our question is that all fields “lose” money, humanities and STEM included, but the humanities are subsidized relatively less than STEM.

There are at least two implications of this conclusion. First, when a department proposes a new degree program that will add students and local revenue, remember that unless it is an unusually high tuition program with little to no financial aid (such as a professional program aimed at executives), odds are that it will still incur costs to the institution that need to be built into budget plans. Second, the impact of subsidies for all will be modulated by enrollments, such that low or high subsidy programs may in turn have high or low enrollments that can amplify or diminish their overall financial impact in total dollar terms. Oftentimes these effects can creep up on an institution as enrollments ebb and flow across the disciplines. We’ll examine those next.

6.6 How have popular majors shifted over time?

Student enrollments have more than doubled over the last half-century (Figure 4.13), though not all undergraduate majors have grown in matching proportions. Perhaps unsurprisingly given the digital revolution, from FY1971 to FY2016 library science shrank from 1,000 majors to less than one tenth of that number, while computer and information sciences grew almost 30-fold from about 2,000 to over 60,000. In relative terms, library science went from 0.1% of all majors to almost zero, while computer and information sciences grew from 0.3% to 3.4% of all majors, more than a tenfold relative increase (Figure 6.4).
These sorts of shifts can have significant financial and personnel implications for departments that shed or gain majors (and SCH) relative to others on campus. In the short term, annual fluctuations are often handled by adjusting class sizes or by increasing or decreasing the number of contingent faculty members and class sections. In the medium to longer term, as clear trends become evident, areas of persistent
absolute growth or decline will almost inevitably lead to a concomitant shift in the tenure-track faculty. In a decline, depending on the career demographics of the department in question, the adjustment to the underlying cost structure may happen expeditiously, via attrition of positions through retirements and individual job moves, or it may be delayed considerably.

Returning to Figure 6.4, let's review the most dramatic shifts in sheer numbers of majors over the forty-five years. The two fields that have grown the most are business and health. Business, management and marketing added over 250,000 majors and the health professions added over 200,000 (most of that in the last decade), which represented relative increases in percentages of all majors of 5.6% (13.7–19.4%) and 8.9% (3.0–11.9%) respectively. Other growth fields in absolute terms include communication/journalism, psychology, biosciences, visual/performing arts, computer/information sciences, and engineering. Some of those, such as communication/journalism and computer/information sciences, increased their share of all majors by several percentage points, while others such as psychology and biosciences saw modest growth in their relative share of all majors.

The field that has shrunk more than any other is Education, with total enrollments dropping by half (from 176,307 to 87,147) between FY1971 and FY1986 and holding roughly constant since then, accounting for its 16.5% (21.0–4.5%) reduction in share of all majors over the half-century. English language and literature, much like education, lost about half of its enrollments in the 1970s (dropping from 63,914 to 31,922 from FY1971–FY1981) and although it recovered somewhat in the 1990s, it has dropped again in recent years. That’s a 5.4% (7.6–2.2%) drop in relative share of all undergraduate majors over the forty-five-year span. Although their enrollments are smaller, foreign languages, literatures and linguistics mirrored the decline/recover/recovery pattern of English, and hundreds of foreign language programs have closed in recent years (Johnson 2019). Mathematics and statistics saw a similar decline and has recovered only in the last decade. With net flat enrollments over the half-century, both fields were crowded out by other growing fields and each saw their share shrink from about 3% to about 1% of all majors. One final interesting example is social sciences and history, which enrolls about 160,000, again net flat over time, but with a similar cycle to English, in that it has seen a substantial loss of 10.1% (18.5–8.4%) in relative share, second only to education.

Not only do these shifts illustrate the dynamics behind changing departmental fortunes within the university, but they also reflect broader vicissitudes in the academy and in society. There is no denying that students vote with their feet (as do parents with their dollars). Like it or not, those votes reflect diminished interest and support for majors in education, languages and literature alongside increased attention for business and health. We can and should vigorously debate those priorities and what they mean, as US higher education has done since the late 1800s and before. As we do so, it’s worth a reminder that ours is the system that, through the land-grant acts, inserted
a more practical education into the classical curriculum of the day. Furthermore, it is also the system that in the mid-twentieth century massively expanded access to higher education and thereby the purposes and people that it serves.

6.7 What does it cost to run a graduate program?

Graduate education is the jewel in the crown of US higher education. It has long been the envy of the world and remains so, despite rising competition from Europe and Asia. Several factors contributed to the ascent of US graduate schools: co-evolution with disciplinary specialization (especially in the sciences) during the twentieth century, the inclusion of advanced coursework rather than “dissertation only” degrees, unprecedented government research investment during the postwar years which fueled the rise of research universities including support for research assistants (RAs), and simultaneous massive growth in undergraduate enrollments which fueled support for teaching assistants (TAs). The US model, especially for the PhD, of a structured experience through advanced seminars and mentored apprentice-like research training, along with a part-time assistantship to support the student, was radically different from the lone scholar model prevalent in Europe. I could go on about the many other innovative attributes of US graduate education, but I’ll spare you that excursion and instead make my point about graduate programs and university business: while this approach undoubtedly enables the highest quality education, by paying one’s students to attend graduate school, educating them in very small classes and providing them with extended one-on-one training with renowned experts, it is an incredibly expensive (and on the face of it, utterly foolish) business model! How do we make it work?

It works by the mutual reinforcement of attracting the best faculty and the best graduate students who want to work on their scholarly topic together. Crucially, it’s also built around the teaching support required for the undergraduate operation and, in fields where sponsored projects are available, the competitive research grants that those faculty win. There is one other distinct model, the professional master’s degree, that teaches technical and/or executive content and that, because of desirability and anticipated future earnings, can charge market rates without assistantships and tuition waivers.

Let’s do some numbers. For a tuition/fee-driven professional program, things are straightforward enough that we don’t need a worked example; the program revenue must simply be enough to fund the costs of operating the program. For the PhD scenario, I’ll keep things simple and deal with program-level funding only, acknowledging that other institutional support costs are out there. In partial justification thereof, we’ll assume our scenario is taking place in an existing department with an active undergraduate program and the faculty already in place. At some point those faculty members, especially if this is a research university, will want to start a graduate
program. With the large expenses of core infrastructure and salaries covered, so the thinking goes, the marginal costs of adding a few core graduate classes to augment classes already available in related fields is low.\footnote{Permutations of this basic scenario were proposed to me several times per year when I was a graduate dean, which is when I developed this back-of-the-envelope approach to help the faculty hone (or abandon) their plans.} Question: OK, so what does it cost? Answer: about a million bucks a year. Never fails to get people’s attention.

Here’s the logic (Table 6.3), line by line, for the basic first-order (program level) annual costs of a PhD program. We’ll provide half-time assistantships at a going rate of $25,000 per year (line A). Each student’s tuition will need to be covered, either by paying it directly (typically via a research grant) or via an internal waiver (typical of teaching assistantships), plus an amount for benefits, and we’ll assume that to total $15,000 per year for a public university (line B). A doctoral program needs to meet minimum size or productivity requirements, which are often imposed by boards, for example an average of 3 graduates per year (line C). A minimum size is also necessary for academic reasons to enable a viable cohort for class sizes. If the program offers its classes on a two-year rotation, that means 6 students in a graduate seminar. Attrition is easily forgotten because, by definition, those students are no longer in the program (whether for academic or personal reasons), so we’ll add 1 per year for attrition (line D). Therefore, the program must plan to admit and support 4 students per year, and further support them for the duration of the program. We’ll assume the average time-to-degree in our example discipline is six years (line E). As an aside, one can infer that this must be a nominal five-year program as students rarely complete early and more often take longer, given the vagaries of their dissertation projects.

Table 6.3. Example of annual first-order costs of a modest PhD program (see text for explanation).

<table>
<thead>
<tr>
<th>Line</th>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Assistantship stipend (0.5 FTE)</td>
<td>$25,000</td>
</tr>
<tr>
<td>B.</td>
<td>Tuition &amp; benefits</td>
<td>$15,000</td>
</tr>
<tr>
<td>C.</td>
<td>Minimum completions per year</td>
<td>3</td>
</tr>
<tr>
<td>D.</td>
<td>Attritions per year</td>
<td>1</td>
</tr>
<tr>
<td>E.</td>
<td>Average time to degree (years)</td>
<td>6</td>
</tr>
<tr>
<td>F.</td>
<td>Program coordinator (0.5 FTE incl. benefits)</td>
<td>$35,000</td>
</tr>
<tr>
<td>G.</td>
<td>Operations</td>
<td>$30,000</td>
</tr>
<tr>
<td>H.</td>
<td>CALCULATED TOTAL: (A + B) \times (C + D) \times E + F + G</td>
<td>$1,025,000</td>
</tr>
</tbody>
</table>

The program thus has a steady state of 24 students, 4 per year for six years (slightly less if there is some early attrition, but we’ll ignore that for simplicity).
will need to add a staff member to coordinate admissions, exams, funding, etc.; a half-time position is enough for this modest-size program (line F). Finally, there are always operational costs (travel, computers and printers, etc.) so we’ll plug in a number for that (line G). As mentioned above, we will ignore other marginal costs such as foregone undergraduate teaching activity/faculty time, central support costs, and space. Adding it all up, we get a total of slightly over $1M per year (line H).

To succeed, the program must have the capacity to support twenty-plus students and some operations costs on a sustainable basis. The mix of TAs and RAs to achieve that varies from virtually 100% TA in the disciplines with little to no grant activity (e.g., humanities) to virtually 100% RA in grant-active disciplines (e.g., biosciences), and with many disciplines somewhere in between. For a 50:50 mix, 12 TAs would be derived from, say, 36 discussion or lab sections (at 3 per TA), each with 25 to 30 undergraduates, for 2 semesters, which is about 2,000 undergraduates or 6,000 SCH per year. The RAs would each be supported by grants with a minimum of, say, $100,000 in direct costs (the RA, principal investigator, other staff, equipment) plus indirect costs at 50%, totaling $150,000, which for 12 RAs approaches $2M per year in external grant support. These numbers reflect an active teaching and research operation. A graduate program with less than those levels of activity will need to obtain additional funds from the dean, who will cross-subsidize from other areas.

6.8 How much do the faculty earn by discipline?

In Section 5.7 we saw how overall faculty salaries were stratified from senior to junior rank and how they were generally stratified by size/type of institution. In Section 6.4 we saw how average faculty salaries by discipline were a key driver explaining differences in the cost of producing a degree across academic fields. To round out our coverage of salaries, Figure 6.5 illustrates average salaries of tenure-track faculty by rank across a set of 32 disciplinary fields. These data are collected by survey each year, with the FY2018 data representing 696 institutions and 162,818 full-time tenure-track faculty members (College and University Professional Association for Human Resources 2019). The emphasis here is on the variations across disciplines, which are determined by the market. The top end of the salary spectrum contains fields that compete, at least in part, with higher private-sector salaries such as law, business, engineering, computer/information science, architecture and the health professions. Note that medical school faculty, most of whom are practicing physicians, are not included in these data and their salaries are considerably larger than the others shown here (see also Chapter 11). In most arts and sciences disciplines, where there is little direct private-sector competition with academia, salaries across those fields fall in a compressed range of about $15,000 in each rank, or within roughly plus/minus 10% of the average. These ranges reflect moderate competitive forces in the disciplinary salary markets. In these sorts of fields, theology, the arts, languages and literature are at the lower end of the salary spectrum with social sciences and STEM fields in the middle ranges.
6.9 What are the financial implications of tenure?

This is another one of those fraught questions where the opinion-to-fact ratio runs high in discussions about the ills of higher education. Tenure is misunderstood by many, including those in the professoriate. To avoid confusion, let’s start with a definition and follow that with a few paragraphs of basic explanation:

Tenure is the granting of certain employment protections against arbitrary dismissal that, absent just cause for discharge, create the expectation of renewed appointment each year.

Employment contracts span a spectrum regarding the protections they contain. In jobs with low protections, employees work “at will” and they can be dismissed on the spot for no reason and without much, if any, due process. In jobs with medium protections, employees might receive a reason for dismissal and may have recourse to a review process and, assuming no egregious wrongdoing, they will receive notice of their employment and pay ending after several weeks. In jobs with high protections, such as those with tenure or union contracts, before dismissal there is an extensive review process that typically goes beyond the employee’s direct supervisor, there are established rules about what are and are not valid reasons for dismissal (“just cause”), and again assuming no egregious wrongdoing, the notice of employment and pay ending may range from weeks to months to the end of the contract year.
A tenured appointment is preceded by a probationary period (typically five to seven years) on the tenure track. Although there are exceptions, assistant professors are usually on the tenure track and associate and full professors are usually tenured. An assistant professor must demonstrate sufficient quality and quantity of scholarly work to be granted tenure (and if denied will depart the institution or move into a non-tenure job). Most universities have annual and/or post-tenure review systems for ongoing assessment of productivity. Contrary to misconception, tenure is not a sinecure and just cause for dismissal includes poor job performance. Other just causes include things like violations of research integrity, serious violations of institutional rules (e.g., stealing, severe harassment), and moral turpitude.

Tenure exists primarily to protect its close relative, academic freedom, so that professors cannot be fired for teaching or doing research in their area of expertise that may be politically unpopular, undesirable to certain interests, or otherwise controversial. History has plenty of examples of this, such as Galileo’s imprisonment for being at odds with the Church by positing that the Earth revolved around the Sun, and prohibitions on teaching Darwin’s theory of evolution, as well as multiple contemporary calls for professors to resign or be fired because of their work on divisive issues (e.g., the politics of race and religion, or “unpatriotic” findings on terrorism). In my own research specialty, climate science, I have colleagues who have felt the pressure of the fossil-fuel industry and associated political forces for whom the scientific findings are an inconvenient truth. The American Association of University Professors (AAUP) is the keeper of the flame for academic freedom and tenure (American Association of University Professors 2019b; 2019c); its 1940 Statement of Principles on Academic Freedom and Tenure (American Association of University Professors 1940) is the definitive document on the subject and the AAUP website has further supporting material.

Returning now to the financial implications of tenure, it’s been said that the granting of tenure is a million-dollar decision. That’s because a professor, once tenured, might be expected to work another thirty years at the institution (or move to another, ensuring that the new position comes with tenure). The original statement must date back many decades, because at current associate and full professor salaries the long-term commitment of the institution is closer to three million dollars without including benefits. An interesting economic corollary of this implication is that, compared to positions they might obtain in the private sector, professors are willing to accept lower pay with tenure because of the implied long-run commitment and perceived lower risk of job loss. Much can be made (misguidedly) from the fact that tenure imposes large fixed costs on the institution and that universities need greater flexibility in how they allocate resources. This argument is specious because, and we’ve seen elements

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2 The term is a good one, even without being enshrined as the title of Al Gore’s award-winning movie. Interestingly, the movie’s title was debated right up until its screening at Sundance (Armstrong et al. 2016).
of this point in every chapter of this book so far, tenured professors make up a small proportion of the overall university budget. Let’s do those numbers to make it clear.

Although we examined faculty ranks and trends in Chapter 5, there we dealt with tenure status as implied from job titles. To look at tenure numbers explicitly, Figure 6.6 shows the share of faculty by tenure status. Although the patterns are generally similar to the earlier charts on faculty rank, there are some differences in the details here because we are including part-time faculty as well as non-instructional faculty (typically research faculty at the bigger schools). About half the faculty are on the tenure track or tenured, with a higher proportion at R1 than R2 schools, and lowest at the R3-M3 institutions; the share is largest at baccalaureate colleges, especially the privates. These proportions are unevenly affected by the share of part-time versus full-time contingent faculty that can exceed 60% and even 70% at medium and small institutions. Overall, by headcount, tenured faculty average under 40% of the total. If we compare the underlying numbers to total non-medical employees (back in Figure 5.2) the we find that the tenured faculty averages about 12% of the total. That means that 88% of the labor pool is “flexible” in an economic resource sense. Furthermore, we saw in Chapter 3 that labor expenditures average about two thirds of all expenditures, so there is even more flexibility of resource allocation in the overall budget. In short, despite looming large in a perception sense, tenure is not any more limiting in fact than many other parts of an institution’s financial commitments.

Figure 6.6. Share of non-medical faculty in instruction, research and public service by tenure status in FY2018. Tenured and tenure track faculty are shown as combined full-time and part-time appointments (less than 3% are part-time), while contingent faculty not on the tenure track are shown by full-time (FT) and part-time (PT) appointment. Source: IPEDS (2020).
Another oft-misunderstood financial aspect of tenure is what happens if there is no money. It is critically important to understand that tenure is an employment protection, and not the employment itself. Put more plainly, there is no money attached to tenure. If a university runs out of money, as has happened at some small colleges in recent years, that “financial exigency,” as it is known, is considered a just cause that can enable the dismissal of tenured faculty members. Now, a university that decides it wants to close one department can’t easily claim “Sorry, we don’t have enough money, we need to close your department and get rid of the tenured professors!” Apart from the institution likely being able to carry out more conventional budget cuts if this was just one department in question, the university would have to declare a financial exigency, a last-ditch kind of move (somewhat akin to restructuring to avoid bankruptcy in the for-profit world) that can have significant consequences for its bond rating and ability to borrow. But if it really is in dire straits, a university can indeed lay off tenured faculty. A related scenario applies to medical schools, where the faculty are basically funded from their clinical activity. If the hospital goes belly-up and cannot meet payroll, the university will likely have no alternative way to cover the sizable salaries of the medical school professors, tenured or not.

Box 6.1. Competition in Faculty Hiring is (Sort-Of) Like Professional Sports

The arcane ritual of hiring a professor can seem odd to those outside the academy. It helps to think of departments as a bit like professional sports teams. Disciplines are specialized fields that don’t generally compete across fields for faculty members, just as football doesn’t compete with basketball for players. Within each discipline, however, there is competition taking place across institutions and among the faculty in the field: institutions compete for the “best” faculty members and faculty members compete for the “best” jobs. As with any other career, while salary and prestige certainly play into job changes, there are many other factors influencing when or why people change jobs (e.g., family, location, position “fit”). Faculty jobs differ from most others because, in all but the biggest cities, there is generally a maximum of one potentially suitable position in that specialty at the university or college in that town. If a town has one basketball team, then there is generally only one point-guard position that might become available. In either case, many people will try out for that one slot when there’s an opening. In a departure from the metaphor, tenure-track faculty hiring is largely done by the team (the whole department or a committee) and finalized by the department head and dean. When an offer is made, there may be a counteroffer by the person’s current department. Sometimes there are pre-emptive retention offers to dissuade someone from looking to move. For professors, the money is nowhere near as big as in professional sports, but the odds of landing a position are arguably better!
6.10 How do we account for faculty time and workload distribution?

Faculty members are the keystone species in the ecosystem of university employees, the core individuals carrying out the academic mission. Even so, the mix of duties reflecting that mission is not uniform across faculty members, plus the academic year is inherently seasonal, so how do we account for what the faculty is paid to do? It turns out that descriptions of faculty workload and cadence, and associated lingo, follow some common conventions across the wide variety of US higher education institutions; differences from one institution to another are typically minor variations on the overall theme.

Let’s get a stone out of the faculty’s shoe right up front. There are those outside the academy who think that all the faculty do (or ought to do) is teach, by which they mean that faculty members should be in the classroom instructing all day, because that’s all that universities do, right? That’s as ridiculous as saying that lawyers must be in court all day or that, ahem, legislators are supposed to be in session all the time. Enough said.

Faculty members are “exempt” employees under the Fair Labor Standards Act (FLSA), meaning that they are exempt from overtime pay and the minimum wage. Exempt employees are not paid by the hour but instead receive a salary for the overall work they perform, typically in professional, administrative or executive positions. The faculty, like other members of the learned professions, meet the professional exemption test because their duties are primarily intellectual, require advanced knowledge in a field of learning, and regularly entail the use of discretion and judgment (US Department of Labor 2016; 2018).

Contrary to casual assumption among uninitiated faculty members, there is no presumption of a forty-hour work week precisely because they are exempt employees under the FLSA; one is paid to get the job done no matter how little or how much time it takes. Studies have consistently found that full-time faculty members work fifty to sixty-plus hours per week. As long ago as 1942 the median was fifty-eight hours (Charters 1942), in 1992 and again in 2004 the average for full-time faculty at four-year institutions was fifty-four hours (National Center for Education Statistics 1993; 2008; Cataldi et al. 2005), another study obtained an average of sixty-one hours at Boise State University (Ziker 2014), and University of Wisconsin-Madison reported an average of sixty-three hours per week (Blank 2015). Where cited across these sources, the variation across institution types, faculty ranks, and disciplines was consistently small, typically plus/minus a few hours.

The “hours worked” number therefore represents a faculty member’s 100% total effort, a denominator that is variable from person to person (and to head off a corollary rookie assumption to the one above, there is no connection between effort percentage and a forty-hour work week). The 100% is split among the three core academic mission
activities of teaching, research, and a range of other public/professional service duties such as administrative assignments, clinical activity, cooperative extension, university and professional review teams and committees, and peer-review or editorial service for scholarly journals. When referring to faculty workload, one properly means the mix of percentages across all these activities that add up to 100% overall, although it is sometimes used less precisely and confusingly as a contraction of faculty teaching workload (a.k.a. teaching load).

Most, but not all, faculty members are appointed to work an approximately nine-month academic year. Depending on whether a campus calendar is based on semesters or a quarter system, exactly how long those last, and local policies on expected pre-term preparation and post-exam grading periods, the appointment period may be as short as seven or eight months or extend to ten; in any case, the standard academic year does not include summer and the standard faculty member is technically unpaid for that time. There are plenty of exceptions to this general practice. At land-grant universities, professors in agriculture often have an association with Cooperative Extension and may therefore have twelve-month contracts. Likewise, medical school professors have associated clinical responsibilities and twelve-month appointments. Faculty members at research universities in disciplines where external grant funding is available have an incentive to augment their nine-month (i.e., three-quarter time) salaries up to the full twelve-month equivalent, as compensation for grant-specified research performed over the summer (and in short breaks depending on local policy). Grants can also be used to “buy out” teaching in a regular semester using an appropriate percentage of the individual’s salary. Department chairs and others doing part-time administration duties may also receive summer compensation for their duties if they are expected to work during that time.

You may have heard of faculty members doing outside consulting work. Any such activities must take place strictly outside of the effort and hours discussed above, and independently of the institution. Many universities have a contractual prohibition on full-time faculty members working for another entity, with a carve-out for consulting done as an individual. Best practices for such consulting include pre-approval by a supervisor to ensure that the faculty member has the time and flexibility to handle an outside commitment without negatively affecting primary faculty duties, and to cross-check potential conflicts of interest.

Statements of faculty workload distribution apply to the academic year and are often expressed as a string of three numbers representing teaching, research, and other service,\(^3\) totaling 100%.\(^4\) For example, a common distribution at R1 institutions is

\(^3\) Convention varies as to the order of the three numbers. The third is almost always service; however, teaching and research can be in either first or second place and they are sometimes ordered such that the bigger of the two comes first. It’s best to check.

\(^4\) The individual percentages are typically round numbers in multiples of 10, sometimes multiples of 5, and occasionally in some finer split. The general idea is that they are broad estimates of effort meant to provide a shorthand summary of a complex set of activities, often interrelated, rather than a precise accounting.
40/40/20, whereas at an institution with lower research and higher teaching emphasis a 60/20/20 distribution would be more typical. Contingent faculty members with a teaching assignment might have an 80/0/20 distribution, while a research professor doing no teaching might have a 0/80/20 distribution. Often, new faculty members will be assigned a lower initial teaching load so that they may get up to speed in the first year or two. Survey data of faculty work time percentages illustrate the three-part average workload distributions across types of institutions with astonishing clarity (Figure 6.7). The other service component is almost unwavering at just over 20% across all types of school, with the share of teaching and research activity varying primarily with the missions of the schools and showing little distinction between public and private institutions.

![Figure 6.7. Work time distribution of full-time faculty and instructional staff by level and control of institution. Source: NCES Digest/NSOPF:04 (National Center for Education Statistics 2008).](image)

Teaching can comprise many activities, some easier to count than others: large introductory undergraduate courses that may or may not have graduate teaching assistants; medium size upper-division classes with a heavy writing emphasis; small graduate seminars; multiple sections of the same class versus each class being different. There is more outside the classroom: class preparation; grading; advising; mentoring; curriculum coordination; and more. Useful metrics can include student credit hours, classroom hours, class size, student contact hours (the two previous metrics multiplied together), and of course, number of class sections. All these items are primarily about quantity, and none deal with quality (assessment of teaching and learning is a hugely important topic, but one for a different book). Many institutions
have formulated local combinations of the above that strive for an equitable balance of teaching commitments, at least within disciplines or colleges.

Despite the minutiae, and much as for workload distribution, a simple lingua franca of teaching loads is widely used for shorthand purposes and it is based simply on classes (sections) taught by semester and year. For example, a professor at a research university might teach a 2-2 load, meaning two classes in the Fall and two in the Spring semester of a regular academic year, while a professor at a baccalaureate college might teach a 3-3 load with lower expectations for research. A 4-4 load is usually only carried by lecturers and instructors at a university, because their assignment is dominantly teaching (a 5-5 load is ordinarily only found at a community college). As an astute reader, you may have noticed that teaching one section seems to correspond to about 10% of effort but beware, “there be dragons”, as the edges of ancient maps used to proclaim, because both workload distribution and teaching load are highly generalized, and they gloss over details and customs that can be of great consequence locally.

Now that you know the jargon, you can decipher a comment like the following that you might easily hear at a faculty gathering: “I’m at fifty percent admin while I’m department chair. I’m glad the dean agreed to a one and one load, so I can keep my research going.”

6.11 What is happening in online higher education?

As with other sectors experiencing digital transformation, online higher education has seen its fair share of hype and myth, while evidence is emerging about significant changes that are under way. Let’s review the former before analyzing the latter.

- **Money:** Online technology was supposed to drive down the price of a degree by driving down the cost of production. Hopes for cheap (or virtually free) degrees, or inversely, institutional hopes for a windfall, have not materialized. Marketing, instructional support, and course development drive costs up while competition drives pricing down, and the upshot is that the typical institution charges near-standard tuition, often more with fees (Poulin and Strout 2017; Legon and Garrett 2018).

- **Disruption:** Clayton Christensen originated the theory of “disruptive innovation” and applied it to higher education (Christensen and Eyring 2011), and he followed that book with predictions that half of American universities would go bankrupt within a decade (Lederman 2017). It’s been almost a decade and nothing of that scale has happened. The core idea is that online technology fundamentally changes the business model for higher education, leading to the disruption seen in other sectors. While his timing and hyperbole were wrong, the jury is still out on his underlying ideas.
• **MOOCs:** Massive Open Online Courses perhaps defined the high-water mark of online hype in higher education, circa 2012. Elite universities and others opened MOOCs to anyone for free but, pointedly, not for credit towards a degree. Millions registered for these classes in the US and around the world; exceedingly few (3–5%) completed them (Coffrin et al. 2014) and specialized interventions to raise completion have not had widespread success (Kizilcec et al. 2020), although MOOCs may yet find a limited role (Yang 2013; Hoxby 2014; Impey 2020).

• **Access:** The potential of online higher education to reach those who traditionally have not had access, domestically and internationally, still holds promise although there has not been much progress in online utilization by low-income and other under-served populations in the US, or by people in developing countries. But, and it is a big but, access to online higher education has been transformational for those already in the workforce and in the military (see below).

• **Unbundling:** Amid the disruption and MOOC fever, online was supposed to lead to the unbundling of degrees as the core credentialing vehicle. Degree programs and classes would be split into modules and via micro-credentialing (e.g., badges) could be used alone or assembled into certificates. There’s some of that in workplace training, but it’s not visible in online higher education where the fully-online degree is the core strategy (Legon and Garrett 2018).

• **Poor Quality:** In the early days the quality of teaching and content in online higher education carried a stigma. A side-benefit of the MOOC infatuation was the engagement of the elite institutions, which helped overcome perceptions of poor quality. Nowadays, even with the pandemic-related surge in online delivery, it is increasingly considered equivalent in quality to conventional higher education (and indeed better than a mediocre face-to-face lecture class).

• **Luddites:** In other sectors there were sentimentalists, such as those who could not imagine reading the newspaper on anything but paper (and a day late), or those who could not imagine losing the ambience and serendipity of the neighborhood bookstore. Let’s also not forget the spectacular strategic shortsightedness of Kodak not anticipating digital cameras or Blockbuster video stores not grasping the advent of Netflix and streaming. Nostalgia for the ivied groves of academe, along with uncritical denial of the advantages of online technologies, is not a viable strategy.

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5 This evocative phrase was used by Mary McCarthy (1952) as the title of her academic novel, one of the first in the genre that has since grown to include dozens (Wikipedia 2019a). Selected gems include Jane Smiley’s *Moo* (1995), *Straight Man* by Richard Russo (1997), *Disgrace* by J.M Coetzee (1999) which helped him win a Nobel Prize, and Julie Schumacher’s *Dear Committee Members* (2014).
Online tools clearly add value to multiple aspects of teaching, learning and knowledge dissemination through multimedia materials, asynchronous and synchronous delivery, and perhaps most importantly in comparison to earlier distance technologies such as video courses, interactivity. Yet, face-to-face higher education, especially for eighteen-to twenty-two-year-olds in the US university context, has strong experiential and extra-curricular components that are not easily replicated online. The online debate, when considered coolly and without hype, is not an either/or discussion between these two alternatives; the smarter approach is to consider how mode meets market and mission. US universities are already diverse in their markets and missions (small elite private, large public research, regional comprehensive, technical or liberal arts focus, commuter or residential, applicants who are high school graduates or already in the workforce, etc.), and online approaches will have advantages and disadvantages particular to each context. In some cases, online approaches will complement and strengthen an institution’s business model, and in others they may indeed threaten that model. Savvy institutions are figuring out what is best for them and adjusting their courses accordingly. Some have implemented dramatic changes, others are steadily diversifying, and many others are still on the sidelines. Much of this has been accelerated by the flip to remote instruction during COVID-19, but it remains to be seen what mix institutions will return to post-pandemic.

It’s important to include data from outside the four-year nonprofit segment for context, because much of the early action in online higher education has been in for-profit institutions. All institutions with more than 10,000 fully-online enrollments in FY2019 are shown in Figure 6.8, which includes not only for-profits but also baccalaureate special-focus colleges and two-year institutions along with our usual set of four-year nonprofit institutions by type. Examining the set by sheer size of online enrollments, in FY2019 the University of Phoenix had 94,000 enrolled online, a shadow of the 470,000 it had in 2010. It is now the third-largest online school, with Western Governor’s University (WGU) leading the pack at over 120,000 and Southern New Hampshire University (SNHU) at 97,000, both R3-M3 private nonprofits that have risen quickly in recent years (McKenzie 2018b). Several other for-profits and privates follow them, and at position number seven we find the largest public online university, the University of Maryland University College (UMUC). As an example of an evolving public institution, UMUC has been around since 1947, primarily serving military members and working adults in the region; it recently announced plans for a name change and associated global expansion strategy (McKenzie 2019c). Other major publics with a sizable online presence are ASU and Penn State, as well as two that have acquired previously for-profit institutions that are now affiliated with the parent public nonprofit: Purdue and its purchase of Kaplan (Purdue University 2018), and the University of Arizona and its acquisition of Ashford (McKenzie 2020b). The rising role of the nonprofits versus the for-profits in recent years has been especially noticeable, with nonprofit status signaling quality against growing skepticism of the
for-profit sector in the wake of student loan scandals and the enforcement of gainful-employment regulations (McKenzie 2018b). A related development has been the rise of online program management (OPM) companies to help colleges grow their online course offerings. Those contracts can cede extensive control and up to half the tuition revenue to the OPM, what a recent report calls a “deeply unsettling picture” (Hall and Dudley 2019).

Figure 6.8. All institutions with greater than 10,000 students in exclusively online (a.k.a. distance) enrollment for FY2019 (Fall 2018), by Carnegie classification and control, including private for-profit institutions, baccalaureate special-focus colleges, and two-year colleges. Source: IPEDS (2020).
While there is little question that change is afoot, it is not entirely clear in what ways online education will reshape universities. Think for a moment about the nature of adaptation to technological change in dramatic entertainment: just over a century ago, it was all about on-stage productions in a theater; with the advent of movies, some aspects of theater moved to the new technology and others remained on stage; television brought a new wave that did the same and in turn disrupted both the theater business and movie-going; and more recently, on-demand streaming video services have changed the game again. My point is not the technological change per se, it is that today we still have the live experience of stage theaters, the immersion of movie theaters (Figure B6), and the convenience of home viewing, with each adapted to its niche. Make no mistake, there were upheavals with each new technology, such as individual theaters closing or adapting to showing movies, or the rise and fall of drive-in movies, the demise of the big three television networks and the rise of cable, and now the shift from cable to online services. In this scenario, which I think is more apposite to higher education than the all-or-nothing examples like Blockbuster and Netflix, there is an evolutionary space for prior forms, especially those with an intrinsic experiential component. Crucially, the evolved niches are still competitive and require continual adaptation to remain relevant and financially viable.

Figure B6. This photograph from July 1, 2006 shows the County Theater in Doylestown, Pennsylvania, a glorious art deco building from 1938 that is still showing movies today. Source: Frederick (2006), Flickr, CC BY 2.0, https://www.flickr.com/photos/galfred/180834829.

Looking now across institutions by type, we can see that the schools with the largest online enrollments are unevenly spread across categories (Figure 6.8). This is partly
because several of the R1 publics designate their online campus as a separate “branch” campus, which is why they show up in the R3-M3 category. Others have a brick and mortar campus identity but they are generally not flagship institutions (e.g., UT Arlington but not UT Austin) although some are large (e.g., University of Central Florida). Also, there is a growing set of schools in the 5,000 to 10,000 online enrollment range (not shown) that are making concerted efforts to grow, such as Georgia Tech, which is carving out a particular niche to become a market innovator (Schroeder 2019). The largest online R1 privates are likewise in that next group of several thousand enrollments, and all are elite names (e.g., Johns Hopkins, USC, and Harvard). There is a handful of R2 schools in this smaller-enrollment group as well and, as one might expect, almost no baccalaureate colleges have significant online enrollments. As we’ve seen, the action is in the R3-M3 category, where WGU, SNHU, and Liberty University are many times larger than most of the other nonprofits doing online education. The number of institutions with substantial online enrollments is still small enough to fit in one figure today, but online enrollments have increased for fourteen consecutive years, with growth in 2016 exceeding 7% across nonprofit institutions (Seaman et al. 2018). No doubt, the online pivot across higher education during the COVID-19 pandemic will add to this trend.

Returning to our regular set of schools, online enrollment data reveal distinct patterns when examined by sub-category (Figure 6.9). Exclusively online enrollments average 5–10% of total enrollments for most types of institutions; private baccalaureate

![Figure 6.9](image-url)
colleges average just 1% and, as we’ve seen above, the R3-M3 privates have the highest share, averaging 26% of total enrollment. Thus today, at the most common type of institution in the nation, the same type that is most financially challenged and has the highest proportion of contingent faculty, over one quarter of all students are already completely online and effectively don’t set foot on campus.

An interesting development has been the rise in blended or hybrid courses, in which students take a mixture of face-to-face and online classes while attending an institution. These statistics are not typically included in counts of “online” students because the classes are taken by students who are campus-based. A student, typically an undergraduate, may opt to take the online version of a class because of scheduling around other classes or a part-time job, availability of open slots, preference for an instructor, degree requirements, etc.—in other words, for many of the same reasons they choose face-to-face classes. In Figure 6.9 we can see that students taking online classes in blended mode are more common at publics than privates, more than 20% of all enrolled students at R1, R2 and R3-M3 publics in a given semester. Because the individuals taking the classes change from one semester to the next, this means that the typical face-to-face undergraduate takes several online courses before graduating. Strikingly, while relatively commonplace, blended learning is not a core strategy at most institutions (Legon and Garrett 2018).

Returning to exclusively online enrollments, you may be surprised to see that graduate students make up a large share of the total, and they constitute the majority at most privates and R1 publics. It turns out that professional and technical graduate degrees for working adults wanting to upgrade their qualifications were one of the early success areas in online higher education; e.g., business, information technology, education, and healthcare were the most popular in 2016 (Silber and Chien 2016). Undergraduate enrollments have since followed and will probably dominate in the long run by sheer force of numbers. As expected, research-focused institutions have greater proportions of online graduate students while the R3-M3 schools and baccalaureate colleges have higher proportions of undergraduates.

The location of exclusively online students may also surprise you. At most types of institutions, the lion’s share of online students is located nearby, in-state. For undergraduates, the national median across all institutions is just 13 miles away, 130 miles on average (Campbell and Wescott 2019). Students from within the institution’s state make up over half of all online enrollments across most types of school. The exceptions are the R3-M3 privates (likely skewed by those few extremely large schools) and the R1 privates whose elite branding enables a national market. The share of online international students is small and averages just a few percent at most types of institutions, a counterintuitive pattern given the potential reach of online and the international nature of other internet technologies. Again, the R3-M3 schools are the exception with over 20% international online enrollments.

To round out our picture of the typical online student, the data show that age and occupation differ from the conventional fresh-from-high-school student. Across
all postsecondary institutions (not just four-year nonprofit institutions) in FY2016, the percentage of undergraduates whose entire program was online (i.e., distance education) was under 4% for age groups under twenty-three years old, and more than 22% for age groups thirty years or older (Campbell and Wescott 2019). The same data set shows that for non-military undergraduates about 10% are enrolled in online-only programs, whereas for veterans and active duty military the figures are 20% and 33% respectively (Campbell and Wescott 2019). Lastly, for undergraduates not working, 7% are in online-only programs versus 22% for those who are working full time (Campbell and Wescott 2019).

Comprehensive financial data for online programs are not readily available, although we can certainly infer funding flows from the various types of enrollment data above. Further insights on the funding of online programs can be gained from a regular survey of chief online officers (Figure 6.10). About half of these respondents see online programs as net sources of revenue for the institution with almost one third seeing variation in cost/revenue balance across programs. Most programs charge standard tuition, many with additional fees (Legon and Garrett 2018). Standard tuition at private institutions is much higher than at the publics, and therefore the privates are less likely to charge higher online tuition than the publics, given competitive market pricing for high-demand and high-reward programs. The allocation of online revenues is seldom dedicated solely to supporting online activities; a combined-revenue-for-general-needs

Figure 6.10. Survey responses of chief online officers at public and private four-year institutions regarding net cost or revenue generation of online programs, tuition rates charged, and whether online budget allocations are dedicated to online, split between online, academic departments and the general institution, or combined with all revenue for general use. Categories do not total 100 because of omitted responses and/or multiple rates at some institutions. Source: CHLOE 2 (Legon and Garrett 2018).
model is the most common at private institutions, while public institutions use almost equally either a split model (between online, academic departments and general needs) or the combined revenue model.

A recent development is the formation of private companies and university spin-offs competing in the market for employer-provided tuition benefits (Fain 2019). Some of that market is for workers who have some college education but did not complete a degree, and another segment is the provision of customized online credential programs that are not full degrees. These intermediary online-brokering companies offer streamlined services to employees, matching them with education providers and managing their tuition reimbursement process, while receiving revenue for those services from the sponsoring employer. No doubt this new space will be developing rapidly as online education evolves.

6.12 What is the budget role of international programs?

International programs have the laudable educational goal of creating graduates who are globally informed. Not only do US students study abroad, experiencing life in a different culture first-hand; the world also studies in the US, bringing a valuable array of international perspectives stateside. In addition to generating cultural exchange, international programs also involve money and markets.

It is useful to appreciate that there are four (sometimes intentionally confused) logics at work in international student mobility (Usher 2019): the pilgrimage logic in which scholars gathered in centers of learning as an academic rite of passage (e.g., medieval times, or Americans to the UK or Germany in the late 1800s); the soft power logic of mutual bond-strengthening (e.g., the US Fulbright program, or the Erasmus program across Europe); the war-for-talent logic in which higher education serves as an international talent magnet for the host nation (e.g., the US since the 1950s); and, the pecuniary interest logic in which revenue from international students bolsters the bottom line of income-challenged public and private universities (e.g., the UK starting in the 1980s, Australia in the 2000s, and the US especially since the Great Recession). The four logics are not mutually exclusive and often the pecuniary interest logic is camouflaged in soft power or war-for-talent terms (Usher 2019).

Budgetarily, most of the action is with inbound international students (the preferred term, rather than foreign students). Their impact is analogous to that of out-of-state students, as we saw in Section 2.13, and growing numbers of universities are contracting with companies that recruit international students into so-called pathway programs with mixed success (Redden 2018). Figure 6.11 illustrates international undergraduate and graduate student enrollments as a share of total enrollment by type of institution for FY2018. International graduate students are disproportionately over-represented (about double the overall rate and reflecting the war-for-talent logic among others) and naturally they are found predominantly at R1 and R2 institutions;
furthermore, note that graduate students make up half of all international students at R3-M3 privates. The highest proportions of international students are found at R1 private universities (over 20%) and at R1 publics and R2 privates (over 10%), with other types of schools averaging 6% international students or less.

Trends in international enrollments have been generally upward across all institution types for several decades (Figure 6.12), growing at approximately twice the rate of overall enrollments. International undergraduate enrollments grew modestly through the late 2000s and then surged dramatically following the Great Recession, presumably in part as an institutional revenue opportunity. International graduate student enrollments saw more consistent growth overall with periods of variability. The consequences of post-9/11 immigration rule changes can be observed as a multi-year downturn in international enrollment in the 2000s; likewise, the downturn in FY2017 and FY2018 appears to coincide with country-specific immigration bans and widely reported anti-immigration rhetoric. That downturn continued in FY2019, and in Fall 2020 the lockdowns and border closures due to the COVID-19 pandemic led to an estimated 43% plummet in new international enrollment (Fischer 2020). International enrollments have rebounded after other major international events (e.g., the 9/11 attacks in 2001), but it is not yet clear to what degree these numbers will rebound after the pandemic.

The total numbers of international students and their primary sources of funding are shown in Figure 6.13. International undergraduates are largely self-funded (with funding by their families or by their home governments or institutions) and only about 9% are funded by the host institution. This is critical from a revenue standpoint: we
can infer that most international undergraduates are paying near-full tuition (and at the publics, this would be at the out-of-state rate). The corresponding share is smaller for international graduate students because a greater proportion of them are funded by the host institution. This funding is typically via graduate assistantships, and we saw in Section 5.9 that those are split roughly 50:50 between research and teaching assistantships. While research assistants usually have their tuition paid by the grant from the funding agency, teaching assistant tuition is typically foregone institutional revenue. Therefore, about 15–20% of international graduate students are funded by the host institution directly. For completeness, Figure 6.13 shows that non-degree seeking students (e.g., visiting for a semester) at either level are a small proportion of the total; also shown are more than 200,000 international students who, after completing their full-time studies, stay on for Optional Practical Training, employment in their field that is directly supported by a salary from the employer and is time-limited (one year, longer in STEM fields).

More than half of all international students in the US were from just two countries in FY2019: China (34%) and India (18%), and they have supplied essentially all the dramatic post-recession growth in international enrollments (Figure 6.14). Enrollments from South Korea and Saudi Arabia, the next two leading countries of origin, have decreased in recent years; the trend for all remaining countries (not shown) was essentially flat from FY2000 to FY2014 followed by modest recent growth through
Like Nobody’s Business

Figure 6.13. All international higher education students in the US and their primary source of funding, FY2019. Source: IIE (Institute of International Education 2019).

FY2018. The dominance of China and India in the portfolio means that any negative geopolitical or immigration issues between these countries and the US could have substantial financial consequences for tuition-dependent institutions. For example, if enrollments from those two countries returned to pre-recession levels, a drop of about 40% in total, a school with 5% international enrollment would see that drop to 3%, representing a 2% decrease in total enrollments and associated tuition revenue.

International programs have several other dimensions, including study abroad (i.e., outbound students), exchange (both directions), and international branch campuses. Because study abroad can entail a significant expense from the student and family perspective, US institutions tend to run their own programs on a cost-recovery or small margin basis rather than as a significant institutional net revenue source (although there are a few that specialize in study abroad, as well as numerous third-party operators). Over 330,000 US students study abroad each year, with Europe dominating the top destinations, which for FY2018 were, in order: UK, Italy, Spain, France, Germany, Ireland, China, Australia, Costa Rica, Japan, South Africa, and Mexico (Institute of International Education 2019).

Exchange programs are entirely different. Their philosophy is to avoid imposing additional costs on the student through a simple mechanism: bodies move, tuition stays put. Agreements are set up so that the students effectively switch seats with neutral institutional impact because they keep paying tuition at home, and the institutions ensure a reasonable balance over time. This is especially useful if pricing is lopsided when compared to the US (i.e., countries with centrally-funded education and low or no tuition, and low-income countries).
An international branch campus (IBC) is partly or fully owned by the providing university, which awards a degree in its name based on an academic program run substantively on-site in the host country. The most recent comprehensive study shows that IBCs have been opening at a rate of about 11 new campuses per year, worldwide, since 2006 (The OBHE and C-BERT at SUNY Albany 2016). Of the 249 in operation serving about 180,000 students, almost one third have home institutions in the US (78) followed by IBCs based in the UK (39), France (28), Russia (21) and Australia (15), per Garrett et al. (2016). The host countries with the most IBCs are China (32), United Arab Emirates (31), Singapore (12), Malaysia (12), and Qatar (11), with the growth seen in the Persian Gulf countries during the 1990s and 2000s now halted and China growing markedly instead (Garrett et al. 2016). Part ownership of IBCs is common, often in partnership with the host government, other educational institutions or private entities, with the rationales for the commitment including revenue, internationalization and status, and with concerns including financial sustainability, mission creep, reputational risk, and academic freedom issues (Garrett et al. 2016). The large initial capital investment in IBCs can sometimes be offset by the local government partner, but IBCs have operational costs and activities that rival a regular campus, including a set of support services (a part of their appeal in recreating the home campus experience abroad) as well as complying with financial, labor and other laws and regulations not only of the home country but also of the host country (Crist 2017). About 13% of all IBCs have closed over time, based on the most recent data (Cross-Border Education Research Team 2017). This is a high failure rate by higher education standards but a low failure rate in comparison to other sectors involving entrepreneurial startups; for
example, 90% over three years in technology (Kinser and Lane 2016). Finally, blended models have emerged, such as a “microcampus” network that merges elements of in-person delivery with online education on a host campus (Redden 2017).

6.13 What are the trends in library expenditures?

University libraries are iconic institutions, often centrally located on campus, that represent both the repository and accessibility of knowledge at the heart of the academy. So much so that some are architectural treasures: the George Peabody Library at Johns Hopkins University, the Linderman Library at Lehigh University, the Suzzallo Library at the University of Washington, and the Geisel Library at the University of California in San Diego (yes, it is named for Dr. Seuss), to mention just a few.

Knowledge in the contemporary era is increasingly stored electronically and virtually, rather than physically on paper, and academic libraries are changing accordingly. The thousands of linear feet of shelf space (“the stacks”) that were devoted to local copies of broadly available periodicals and books are giving way to information commons, study rooms and even classrooms as the library provides support and access to specialized digital information sources from all over the world. Instead of the pre-digital model of purchasing resources once and keeping them forever, libraries now enter into licensing agreements with vendors to purchase access to virtual volumes. To be sure, established libraries will continue to maintain physical collections of special and unique items and even make them available to others digitally. Yet, the workaday set of scholarly journals and other frequently accessed items has been predominantly electronic for years. At smaller schools, 90% or more of serials collections are now electronic; R1 and R2 university libraries house collections of specialized non-digital subscriptions, so the electronic share is 60–80% (IPEDS 2020).

The mix of costs in library budgets is remarkably consistent across types of institutions, with 59% (plus/minus 5–10%) of expenditures going to personnel and operations and the other approximately 40% going to acquiring resource materials (Figure 6.15). Three quarters of the materials budget goes to ongoing subscriptions, the bulk of which are scholarly journals, while the other quarter is spent on one-time acquisitions, such as new books. The challenge for libraries is as follows: total library budgets have roughly kept pace with inflation (more so at bigger institutions and less so at smaller schools, within about 0.5%) but subscription costs have seen rampant increases for decades, well before the digital era.

The trend in subscription expenditures is clear in Figure 6.16, where ongoing subscription costs for research libraries have been increasing by 3.4% over inflation since the 1980s. This contrasts with expenditures for one-time acquisitions, which have remained flat in real terms. Comparable data for R1 libraries are overlaid in Figure 6.16 and, while the amounts are higher for private versus public institutions, the trends are the same. This state of affairs has come about due to monopolistic tendencies in
Figure 6.15. FY2017 share of library expenditures for personnel and other operations and for resource materials, including ongoing subscriptions (e.g., journals), one-time acquisitions (e.g., books), and other materials, averaged across institutional categories. Source: IPEDS (2020).

the for-profit journal market, in which journals are not interchangeable and are only available from one vendor. For highly-accessed journals, libraries have had limited negotiating room as continued subscriptions to those journals are vital to the success of the university’s researchers.

Figure 6.16. Trends in library expenditures for ongoing subscriptions (e.g., journals) and one-time acquisitions (e.g., books) for the median of Association of Research Libraries (ARL) and the average of R1 public and R1 private institutions respectively, by fiscal year in 2016 dollars. ARL data from FY2012 onward are adjusted to account for a survey methodology change. Note that R1 data are available only in even years before FY2014.

Sources: ARL (2016) and IPEDS (2020).
To make matters worse, the large commercial publishers market their journals in bundles, much like cable television providers bundle channels, in which many minor titles are packaged with those in highest demand. This practice became known as the “Big Deal” in which the price per title in a discounted bundle is significantly lower than the sum of the individual list prices, although Big Deal pricing has risen nonetheless. A recent study evaluated the cost-effectiveness of bundled subscription prices by comparing cost per citation from 19 nonprofit and 6 for-profit publishers (Bergstrom et al. 2014). As shown in Figure 6.17, the cost per citation from for-profit publishers is substantially higher than from the nonprofits, with big differences by institution type that reflect the differential willingness (necessity) of major research institutions to pay (Bergstrom et al. 2014). For R1 institutions, the bundle cost per citation averages roughly $1 from nonprofit publishers but about $6 across the major for-profit publishers. The range by publisher is large: about $2 for Elsevier, $3 for Springer, $5 for Wiley, and up to about $11 per citation for Taylor & Francis. At R2 institutions, the average for-profit rate is still more than double the nonprofits, and at master’s institutions it is about 50% more (Figure 6.17).

![Figure 6.17. Average cost per citation for journal subscription bundles from 19 nonprofit and 6 for-profit publishers. Source: Bergstrom et al. (2014).](image)

University libraries have not stood by idly, and through systems and consortia they have had some success in bargaining. The University of California system has taken a notably hard stance, keeping their increases from Elsevier to an average annual rate

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6 The Scholarly Publishing and Academic Resources Coalition (SPARC) makes available a database of Big Deal journal subscriptions by university (SPARC 2019).
of about 1.5% versus the initial 5% for the decade ending in 2013 (Bergstrom et al. 2014); nonetheless, negotiations reached a breaking point in 2019 when the UC system dropped its Big Deal with that publisher, garnering statements of support from other libraries that have done or are contemplating doing the same (McKenzie 2019b). Part of the desire in that negotiation was for a “read-and-publish” deal, which would combine the cost for accessing content behind a paywall with another cost structure known as open access. The UC System recently announced just such an open-access agreement in a landmark deal with Springer Nature (McKenzie 2020a).

Open access is a broad movement, supported by many but not all librarians and scholars, to make published research freely available to read. Under open access, there are two main models: in the “gold” model the author or funding agency pays an upfront processing and publication fee (which can amount to thousands of dollars), while in the “green” model a version of the article is made available for free after a delay period (e.g., six months or a year) but subscription remains for immediate access (Ellis 2019). Many US funding agencies now require the green model, and the major European funding agencies now require the gold model (Ellis 2019).

It is not clear what this will mean for library budgets in the long run. The indignation of scholars at having to pay unreasonable rates to either publish or read research that they produce (and that they peer-review for free as part of the publication process) will only diminish if they move away from for-profit publishers. Yet, many of their most prized journals are from those very publishers; Springer Nature recently announced optional open access processing charges of more than $11,000 per article (Else 2020). It remains to be seen whether the open access movement will succeed in keeping down the costs of accessing the latest knowledge (see Section 9.4 for more on open access).

6.14 How much do we spend on information technology?

Institutions spend about $1,000 per person on campus for information technology (IT). Figure 6.18 illustrates expenditures on central IT per institutional FTE (full-time equivalent students, faculty and staff), with average totals ranging from about $800 to $1,500 per year. Research institutions spend more than master’s institutions per FTE, and baccalaureate colleges (most of which are private) also spend relatively more. Over half of these amounts go towards personnel costs, about one third go to infrastructure and services on campus, and 2–6% goes to external providers (e.g., “cloud” services such as email or web servers hosted offsite). The total institutional investment in central IT can therefore total millions to tens of millions of dollars annually depending on the size of the institution, comparable to a mid-sized academic college. From FY2010 to FY 2016, inflation-adjusted central IT spending per FTE has grown at annualized rates of 0.3% at master’s institutions and 1–2% at research universities and baccalaureate colleges (Lang 2017).
The two main pressures on IT budgets are personnel and the technology itself. Stiff competition from the private sector in the salary market means that pay rates are higher and can rise faster for IT compensation versus other parts of the university, which can also lead to high turnover—it’s not unusual for individuals to spend just a few years in a position before moving to another. The endless treadmill of technology refresh and upgrades means that the IT enterprise has continuous short-term capital outlays. If the Chief Information Officer (CIO) is not provided with the resources to invest in updated networks and systems, as with all deferred maintenance, the institution will fall behind in its capabilities, leading to higher costs later when the inevitable upgrade turns into a crisis. Some system replacement costs are large enough that they need to be amortized over the life of the technology, such as the core enterprise resource planning (ERP) systems like the student information system or the finance and accounting system. An entire ERP replacement project is a massive undertaking in technical and implementation terms, and at a large university the cost can amount to many tens of millions of dollars, similar in financial scale to (and as critically important as) a new campus building.

Central IT expenditures account for about 4.75% of the total institutional budget at master’s universities and baccalaureate colleges, but at public and private research institutions that share is lower at about 3% and 3.75% respectively (Lang 2017). From FY2010 to FY2016 all these percentages remained essentially flat. The lower shares...
at large research institutions occur because distributed (i.e., non-centralized) IT is more commonplace at those schools, partly reflecting the historical emergence of IT in multiple specialized units; 69% and 45% of public and private research universities respectively spend less than 75% of total IT expenditures centrally, while that share is only 9–30% at other types of institutions (Lang 2017). Institutions have difficulty tracking distributed IT expenses consistently, and therefore it is hard to establish reliable trends in centralized versus distributed IT expenditures (Brummund et al. 2015). Recent technological trends have been towards centralization (and outsourcing) of commodity IT services such as email and website hosting. One regular survey shows consistently increasing trends in the percentage of centralized versus distributed campus IT spending for over a decade across all types of institutions: for example, the share of central IT spending increased from around 40% to over 60% at larger public universities, and from about 60% to nearly 90% at smaller private four-year colleges (Green 2007–18).

You may be wondering why I’ve included IT in this chapter on academic affairs, rather than in the facilities section along with utilities like lights and water. Information technologies, in contrast to regular utilities, play a direct and strategic role in furthering the academic mission of the university. Some domains of IT are utility-like, such as basic internet service and, literally, dial tone for telephones. Other domains support the broader administration of the university (accounting, human resources, etc.). Still, IT software and services are critical to not only supporting but also advancing teaching and learning, student success, and research, which is why smart institutions view IT as integral to knowledge transfer and discovery. Figure 6.19 illustrates relative levels of central IT spending across the major IT functional domains including personnel, averaged across institution types because they are similar. While all the domains are essential, some are more visible than others:

- Administration of the IT enterprise includes activities related to the Office of the CIO such as management, planning, vendor contracts, and policy development, and it accounts for one quarter of expenditures;
- Information systems include the core enterprise resource planning (ERP) systems (student information, payroll and financial, procurement, human resources, grants and contract management, etc.);
- Enterprise infrastructure and services include data centers, servers, backup power supplies, web services, databases and more;
- IT support services serve all users such as desktop support, reference staff, departmental support, IT training, and multimedia production;
- The communications infrastructure includes all the physical elements of the network such as cable, wireless network, telephone and voicemail, video surveillance, and emergency notification systems along with communication services such as email, calendaring, and collaboration technologies;
• Educational technology services cover the range of instructional software and support including learning management systems, e-portfolio, degree audit, classroom technology, online education platforms, and library systems and together they account for about 10% of central IT spending;

• Information security covers increasingly critical items such as identity management, access provisioning, authentication, intrusion detection and prevention, breach response, and information security training, with spending on IT security increasing one and a half times over the previous year (to 3% of the total);

• Finally, research computing services are not reflected in Figure 6.19 because they are only significant at the relatively small number of major research institutions, and they include high-performance computing ("supercomputers"), specialized networks (e.g., Internet2), and advanced visualization (EDUCAUSE 2020).

The various software systems and services vary widely in cost and, as might be expected in the dynamic IT environment, the relative spending on each also changes from year to year (Figure 6.20). Student, financial and human resources ERP systems are large and growing, and the vendors in this area include Oracle (Peoplesoft), Ellucian (Banner), Jenzabar and Workday (MarketWatch 2018). The biggest institutional investment in instructional technology is learning management systems (LMS). The LMS landscape has been consolidating since the late 1990s when the technology was first introduced,
and over 90% of market share is now held by the big four: Canvas, Blackboard Learn, D2L Brightspace, and Moodle (Hill 2019). An LMS has become an essential tool in face-to-face and online education, although the related technology of adaptive (self-paced and personalized) learning tools has not yet gained wide adoption (Dimeo 2017). The other systems lower down the list in Figure 6.20 have seen flat or decreasing shares of expenditures, and they are generally low to medium in relative expense (the drop for analytics may be related to a definition change in the survey, as it was increasing steeply in prior years). Finally, plagiarism-detection software (e.g., Turnitin) was not listed on the survey, but it is another educational technology tool that is widely used (McMurtrie 2019).

Figure 6.20. FY2016 and FY2018 shares of annual expenditures for ERP, administrative and instructional software and services, averaged across all public and private four-year colleges and universities, sorted by growing (upper portion) or shrinking share (lower portion). Source: Campus Computing Survey (Green 2007–2018).