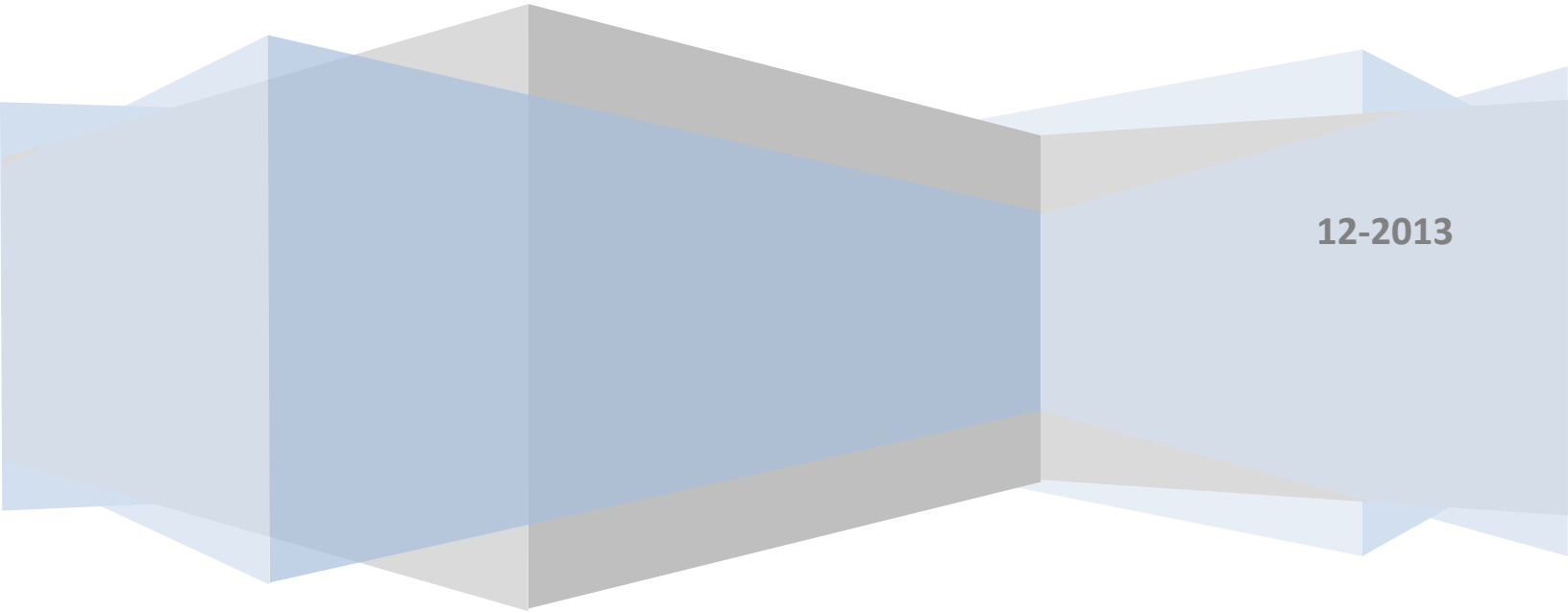
Cost Structure of Post-Secondary Education

Guide to Making Activity-Based Costing Meaningful and Practical

Maria Anguiano, UC Riverside



12-2013

Table of Contents

Appendix

Section 1: Executive Summary

The higher education industry and its observers have wrung hands over rising costs for years. While there are many reasons for escalating costs, there is at least one that higher education leadership has complete control over and could start addressing immediately. The fact of the matter is, there is almost a complete lack of visibility on how much it actually costs to deliver post-secondary education and how those costs compare with the outcomes achieved. While the "measuring higher education outcomes" portion of the equation has been receiving growing national attention, the "cost to deliver" portion of the equation has received much less attention. Both issues must be addressed. Accurately measuring costs and comparing them with outcomes is one of the most important strategies that can be pursued in transforming the economics of higher education.

Since institutions, for the most part, do not understand the cost of their educational activities and how they relate to outcomes, they cannot target cost reductions to specific activities. So when needing to reduce costs, many institutions have turned to simplistic actions such as across-the-board cuts. These types of non-strategic cuts generally achieve only marginal savings and can often lead to higher total costs and poorer delivery of services. Moreover, effective and efficient departments can go unrewarded or are forced to cut muscle while inefficient departments have little incentive to improve. The flip-side of this issue is that institutions also cannot calculate the effect of innovations on their cost structure, such as implementation of new learning technologies. Thus, they end up treating spend in new learning methodologies as one-off initiative costs, not as part of a change in the operating model of the institution, and thus cannot effectively scale these innovations.

Increasing access to higher education will require that we address the fundamental value problem: how to deliver improved outcomes at a lower total cost.

It is a well-known adage in the world of business that what is not measured cannot be managed or improved. Without knowing the cost of their educational activities, faculty and administrators lack the ability to improve productivity in a systematic and sustainable manner. They do not have the information needed to make targeted cost reductions or systematic changes to improve outcomes. A recent survey by Inside Higher Education and Gallup found that "CFO's overwhelmingly said that they view the use of business analytics technology to help them evaluate programs and make decisions as important to their ability to cut costs in the future. But their actual practices show that they may be a long way from doing that." They know they should be focused on performance and metrics but the infrastructure needed to do so is not there.

The main reason for this lack of knowledge is that current financial data is opaque. Professor Jack K. Shank of Dartmouth University stated it best, "Traditional management accounting is at best useless and at worst dysfunctional and misleading."[1]

It is not that traditional accounting is inaccurate, it's just irrelevant when it comes to this issue. Accounting requirements are not structured to measure cost in a way that can answer the fundamental value problem

[1] Massy, 2003

in higher education: How can institutions deliver improved outcomes at a lower total cost? Traditional accounting, groups data in a way that can answer high FASB & GASB financial reporting needs such as how much an institution spends on salaries and benefits. It can even be used to calculate a high level cost figure such as total cost per student. However, existing accounting systems do not provide information on an institution's activities and how changes in these activities affect their underlying cost structure. How can an institution make effective trade-offs between activities if it doesn't know their relative cost or how they affect outcomes?

For example, community colleges are seeking to increase the percentage of students who complete their programs. In these cases, they may decide to spend more money on remedial education or on advising in foundational courses. However, community college administrators don't know the anticipated resource impact of their new completion strategy programs. In addition, they can't compare the cost of new strategies with the cost of the status quo. The ability to slice expenses into activity categories would allow administrators to understand the cost of these new activities as they compare to their total resources. This information could also then be overlaid with changes in the desired outcomes of improved completion, allowing them to compare cost to outcomes. Better cost information on specific educational activities and courses can provide a tool for institutions to improve their performance and help inform resource allocation.

Fortunately, there is a path available that will help answer both these questions. That path requires institutions to look at their costs through a new lens, a lens that will allow them to compare their costs with whatever outcomes are deemed most important for the institutions. This new lens is a combination of activity-based costing [2] with a per course cost allocation strategy. Moreover, this proposed methodology is meant to provide an ongoing operational model, not to be one-time data collection effort.

This white paper will focus purely on the cost portion of the equation, not institutional outcomes. Desired outcomes will vary depending on each institution's mission. This white paper is also not an attempt to measure quality or even productivity, which is a quality adjusted measure of cost. Quality MUST be tracked in parallel, independent of cost. It would be very inappropriate to only use cost measures when making funding and resource reallocation decisions. Not only is this an incomplete picture, but it can very quickly lead to a race to the bottom[3] if effectiveness is measured on cost alone. This white paper is simply an attempt to give administrators an arrow in their quiver as they seek to understand their costs and improve their effectiveness in delivering quality education. Quality, cost and desired outcomes must all be taken into account when making strategic decisions.

Cost per course was chosen as the fundamental building block of institutional educational expenses for purposes of this white paper. Courses were chosen as the unit to examine costs as they are the fundamental building blocks of every institution regardless of its mission. Institutions can have widely varying missions and purposes. Within the degree-granting institutions, there are also are hundreds of

[2] Activity-based costing is a costing methodology that identifies activities in an organization and assigns the cost of each activity with resources to all products and services according to the actual consumption by each. How this methodology can be applied to higher education will be discussed in Section 3 of this white paper.

[3] Improving Productivity Measures in Higher Education. (2012).

program students could take to achieve the various types of degrees available and varying times to completion. By starting with cost per course, institutions can aggregate costs to whatever level is useful to them.

While cost per course information is a starting point, it is not enough. In order to improve performance, institutions must also capture information on the educational activities performed within each course. Only with costs bucketed into meaningful course activities do institutions have the knowledge necessary to improve academic productivity. With costs calculated by relevant activity, course delivery transforms from being a black box fixed total dollar amount, to being broken up into its component parts and therefore something that can be redesigned and improved. With this information, all departments, deans and faculty are given the tools they need to calculate the cost effect of any changes and innovations in their course delivery, something that has only been accomplished as one-off exercises at institutions in the past.

One of the reasons that activity based costing has not been adopted more widely or has only been performed as a one-time exercise by institutions is that until fairly recently, the technology did not exist to facilitate this type of cost allocation. Past attempts required building very complex models in simple tools like excel, requiring extensive manual collection of data, making updates very time consuming. However, now the technology exists that allows institutions to pull in data from their disparate systems automatically and with the ability to create profiles and cost drivers which minimize manual updates and facilitate the cost calculation. While the US market does not have many institutions using this methodology, in Australia, universities have been undertaking a similar type of costing methodology as the one proposed herein for years very successfully.

This white paper seeks to provide US post-secondary education leaders and administrators a framework and practical guide to categorize their institutions' costs in a way that informs decision making far better than the current data available to them today. This white paper is divided into the following five parts:

Section 1: Executive Summary
Section 2: Examines the current financial data that is being collected from institutions. It will detail the current financial data collected nationally and discuss the gaps in this information for use for institutional level management.
Section 3: Outlines a framework for institutions who would like to implement a per course cost methodology
Section 4: Lays out the needed institutional infrastructure, including data and software requirements to implement this cost methodology.
Section 5: Discussion of the benefits of this costing approach

The proposed methodology will allow for better financial reporting providing academic and other university administrators with the ability to assess their current operations and evaluate financial trends. It will also be invaluable for planning purposes, especially as institutions look to the future and seek to understand the financial consequences of their strategic options and decisions.

Section 2: Financial Data: What information is currently available and what is missing?

Currently the most robust information available on higher education is the Integrated Post-Secondary Education Data System (IPEDS). IPEDS consists of seven interrelated surveys conducted by the U.S. Department of Education's National Center for Education Statistics (NCES). IPEDS collects information from all institutions that receive federal student financial aid, including colleges, universities, technical and vocational institutions, comprising of over 6,700 institutions. IPEDS compiles data on seven distinct areas: institutional characteristics, institutional prices, enrollment, student financial aid, degrees and certificates conferred, student persistence and success, and institutional human and fiscal resources.[4]

The focus herein will be primarily on the financial data reported to IPEDs, specifically the expense information submitted. The primary problem with the information collected by IPEDs is that the functional expense categories (See Appendix A for a complete list and definitions) are too high level to provide anything but a rough estimate of an institution's cost structure. As Bill Massy plainly stated in "Honoring the Trust: Quality and Cost Containment in Higher Education" there are two questions to answer in cost studies, "what something costs and why it costs what is does." The approach taken by IPEDs (and organizations that use the IPEDs functional expense categories such as NACUBO and the Delta Cost Study) to calculate cost per student information, answer the "what" question not the "why". They focus on the overall cost of teaching and research, not the cost of individual teaching and research activities which is needed to answer the why question.

As an illustrative example, **Figure 1** displays a "Spending per FTE student by standard expense categories" compiled by the Delta Cost Project. This table shows great macro information about total costs per type of institution and can be used to compare the various institutional segments' costs at the 10,000 foot level. (A more complete discussion of the various institutional types is included in **Appendix A**) However, it is constrained by the spend categories that are currently collected by IPEDs. IPEDs collects spend information in large categories such as instruction, student services and institutional support. Leaders at HE institutions need to have a more granular understanding of what they are spending their money on. They need to understand the cost of their activities, such as mentoring, curriculum development, developmental education, advising, IT, etc. Only with this data, can leaders think about how to maximize spending on their priorities relative to their goals. Unfortunately, most existing

Figure 1 : Delta Cost Project: Spending Per FTE[5]

Spending per FTE student by standard expense categories, AY 2000-2010 (in 2010 dollars)

	Public				Private		
	Research	Master's	Bachelor's	Community College	Research	Master's	Bachelor's
2010 Spending per FTE Student							
Instruction	$10,139	$6,355	$6,166	$4,805	$20,032	$7,232	$8,423
Research	$6,130	$418	$455	$63	$11,420	$563	$756
Student services	$1,395	$1,442	$1,659	$1,184	$3,432	$2,820	$3,919
Public service	$2,052	$609	$503	$323	$1,286	$423	$615
Academic support	$2,943	$1,541	$1,442	$919	$5,663	$1,738	$2,099
Institutional support	$2,508	$2,048	$2,361	$1,684	$6,857	$3,862	$5,024
Operation and maintenance	$1,804	$1,372	$1,555	$1,042	$4,020	$1,421	$2,095
Education and related	$15,951	$12,240	$12,740	$9,501	$35,068	$16,825	$21,126

[4] Reporting by institutions to IPEDS is mandatory under Title IV of the Higher Education Act of 1965, as amended (20 U.S.C. 1094, Section 487(a)(17) and 34 CFR 668.14(b)(19)).

[5] Delta Cost Project. College Spending in a Turbulent Decade, A Delta Data Update. 2010.

accounting systems don't provide information at this level nor does IPEDs require institutions to collect data at this level.

The lack of data leads to several problems. The first is that it is impossible to determine why there are such large differences in spend by institutional segment. Are some segments spending more money on activities such as advising and mentoring, are they paying their faculty more or are they spending more on academic infrastructure and administration? Given the information available through these studies, it is impossible to know. It also does not distinguish the differences in cost by academic program. For example, is a humanities degree more expensive than a chemistry degree? We cannot answer these questions given the current degree of spend category aggregation. This is important information to know if an institution is planning to expand their program in either of these fields.

From an individual institution perspective, it is only the individual activities that answer the big WHY question. A cost per student ratio gives the institution a high level cost number, but can be misleading. Most importantly, it gives no information on how to do any productivity improvements. Without the ability to analyze the individual cost of educational activities, course delivery remains a fixed cost black box. Faculty members must be given the ability to deconstruct the black box if they are to reconstruct it more effectively.

Not only are the IPEDs categories at too high a level to be useful for institutional management, but they also are not consistent across the industry. For example, there are various ways to treat information technology expenses. IPEDs suggest that they should be included under the instruction category if the institution separately budgets and expenses information technology resources, otherwise these expenses should be included in academic support. In the proposed methodology, each type of cost would have its place in the cost per course calculation.

The section below will describe a new way of breaking down costs to provide useful management data for institutions. While information will still need to be collected using the IPEDs categories for federal reporting purposes for the foreseeable future, the proposed methodology will give institutions a new tool with which to assess operations.

Section 3: Cost Framework

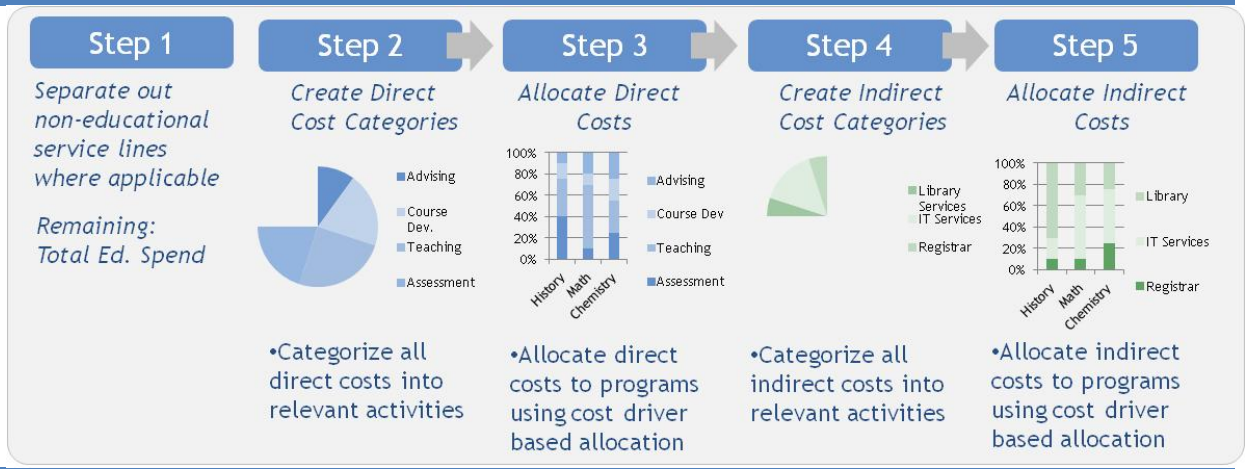
This section provides a framework and practical guide for institutions to follow if they are interested in understanding their cost structure through the lens of activity-based cost accounting. Many cost accounting exercises in higher education in the past have been one-off efforts or focused only on a sub-set of operations. This methodology is intended to provide institutions with the ability to not only produce ongoing cost information for their entire operations, but ultimately to serve as a campus-wide planning and forecasting tool. By starting with the bottom up activity-based data and then rolling it up to course and program information, the dataset achieved is much richer for institutions.

In order to implement this framework, institutions will need to prepare their general ledger, ensure they have accessible non-financial databases and use sophisticated costing software to fully implement this type of solution. As these other requirements are outlined in the **Section 4**, this section will describe solely the mechanics behind the cost framework, assuming institutions have all the other necessary data at hand.

The cost allocation framework is comprised of 5 steps.

Step 1: Identify non-educational service lines (if applicable) and calculate their fully loaded cost
Step 2: Create educational direct cost categories by identifying all relevant direct instructional activities
Step 3. Allocate direct costs to courses/programs through a cost driver based allocation strategy
Step 4: Create educational indirect cost categories by identifying all relevant indirect activities
Step 5: Allocate indirect costs to courses/programs through a cost driver based allocation strategy

Figure 2: Steps in Cost Allocation Framework



Step 1: Separate Non-educational Service Lines (if applicable)

Many types of higher education institutions can be considered multi-product firms because they produce a variety of things, not just education. University of California's Clark Kerr used the term "multiversity" to describe the unique nature of higher education institutions. Although the multiversity is one entity, as far

as cost analysis is concerned, other service lines need to be pulled apart and are most appropriately analyzed separately.

Specifically, the cost of the educational enterprise must first be separated from the business-like, self-supporting set of service lines that many institutions have. These are the activities whose costs should be covered by their revenues. Examples include, auxiliaries, clinics, technology transfer, and externally funded research. Since they are largely self-supporting, increases in revenue or spend here should be irrelevant to those concerned about the educational enterprise. However, it is important that all costs associated with these activities be identified and accounted for separately in order to calculate the true cost of the educational enterprise. To be meaningful, analysis of the cost of education must disaggregate costs to match the disaggregation of revenues.[6] **Figure 3** below delineates eight institutional types and the typical service lines they may have in place. (See appendix A for more detailed analysis of institutional types.) The expenses associated with these service lines are not be allocated to per-course cost methodology outlined in **Section 3**.

Figure 3: Institutional Types[7] & Service Lines

Service Lines	Comm. Colleges	Public Bach.	Private Bach.	Public Research	Public/Private Masters	BDMs[8]	Private Research	For Profits
Education	X	X	X	X	X	X	X	X
Auxiliaries		X		X	X		X	
Research				X			X	
Public Service	X	X		X	X			

Note: Not all institutions have auxiliaries, research, public service or independent operations. This table merely illustrates the variety of activities that can be provided at different institutional types.

Auxiliaries: Auxiliaries are the business-like, self-supporting operations of institutions. These represent operations that charge a fee for their service and provide services to students, faculty, staff, or the public. Examples are housing & dining, transportation, athletic, K-12 services & child care, and other constituent services. Institutions need to ensure that they calculate the cost of these auxiliaries as fully loaded, including costs for operation and maintenance of plant, utilities and any allocated institutional costs. The decision support software that will be used to capture course activity will also be leveraged to allocate costs out to auxiliary enterprises. It may be the case that once the fully loaded cost of auxiliaries is calculated, they may turn out not to be self-supporting. That would be important information for institutions to know and it allows institutions to make cross-subsidization decisions explicitly. Expenses associated with any auxiliary service line should not be allocated to the per course cost.

Research: This refers to externally funded research. As with auxiliaries, institutions need to take great care to ensure that they calculate the fully loaded cost of research, including costs for operation and maintenance of plant, utilities and any allocated institutional costs. Research is a much more difficult area

[6] McPherson and Shulenburger, 2010.

[7] A more complete analysis of institutional types selected is included in Appendix A

[8] Break-through delivery model: Represents a new type of post-secondary institution that leverages technology in their content delivery

to fence off compared to auxiliaries, as there is a lot more overlap between the educational enterprise and research, particularly as faculty time is concerned. If faculty conduct research with doctoral students, is it considered teaching or research? Questions such as these abound in groups discussing this topic. The proposed faculty time allocation methodology is discussed further in the Faculty Workload area in **Section 4**, but suffice it to say that it is possible to split faculty time between an institution's service lines, including teaching, research and public service using high level estimates and still come up with fairly accurate data. It is important to note that faculty also perform internally funded research, but this is generally not considered as part of the business-like research enterprise and thus this cost would not be included in this category. However, departmental research activity could be captured utilizing the faculty workload profile, see **Section 4**.

In addition, many research institutions calculate a "Facilities and Administrative Rate" (F&A Rate), which is a rate that is used to reimburse universities for the infrastructure support costs associated with sponsored research and other sponsored projects. The guidelines on how to calculate the F&A rate are fairly defined and there should be a reconciliation between the methodology proposed herein and the F&A calculation to ensure consistent reporting across the institution.

Public Service: These are activities that provide services to individuals and groups external to the institution. Examples are community service, cooperative extension services, conferences, and similar services provided to particular sectors of the community. Faculty also participate in these services and as is outlined in **Section 4**, institutions can use managerial estimates to split faculty time between the big categories of service lines. The decision support software can be leveraged to calculate the total cost of providing public service, including costs for operation and maintenance of plant, utilities and any allocated institutional costs. Expenses associated with public service should not be allocated to the per course cost.

Education: "Educational" enterprise can actually mean many things. For example, community colleges produce remedial education, certificate programs, academic degree programs, transfer opportunities to four-year institutions and other programs. Public or bachelor degree granting institutions on the other hand primarily produce four-year degrees. Whatever the various outcomes that the educational enterprise is meant to produce, it can be agreed that a course can be considered the building block of the learning production at the micro level.[9] As such, a "course" will be used as the basis by which to calculate the cost of the educational enterprise. When the cost of a course is calculated, then all other educational program or degree costs can be extrapolated and calculated as well. For example, the cost of remedial education programs can be calculated as the sum of the cost of the courses needed to complete the program. If the cost of a four-year biology degree needed to be calculated, all the courses taken by students completing a biology degree at the particular institution could be aggregated. Because the mission and purpose of all 8 institutional types identified in Figure 3 are different, only the cost of a course can serve as the foundation of calculating the cost for the educational enterprise. It is important to reiterate that cost per course information does not speak to the quality of the course or the quality of the institution providing it. Quality and outcomes have to be tracked in parallel by institutions and funding

[9] Improving Productivity measures in Higher Education. (2012).

and allocations decisions must rely on all these considerations. This paper does not intend to comment on either quality or outcomes, both of which must have their own measurement metrics. The purpose of this paper is only to provide a tool to assess educational delivery from a cost perspective.

While the cost of a course will serve as the basic building block for this cost allocation methodology, courses will also be further broken down by activity categories. This will allow institutions to understand the educational activities taking place for each course and will help assess opportunities for productivity improvements. The methodology for this activity breakdown will be detailed further in Steps 2 & 3.

In addition, the education enterprise includes both direct and indirect costs. Direct costs include the costs of providing each course, such as faculty time and classroom space. The activities normally included in the IPED categories of academic support and student services also fall into the educational enterprise. The methodology used by the Delta Cost Project aggregates these expenses at a high level and then allocates them based on percentage of total costs to calculate a high level cost structure. However, the recommended cost methodology herein is based on allocating grassroot activity costs to courses. That way, this information can be included as part of the *fully loaded* course cost but also be analyzed separately when assessing quality improvement and efficiency opportunities. The allocation of these costs is discussed in Steps 4 & 5.

Step 2: Create Educational Direct Cost Activity Categories:

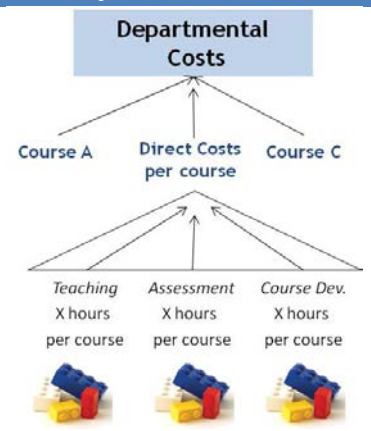
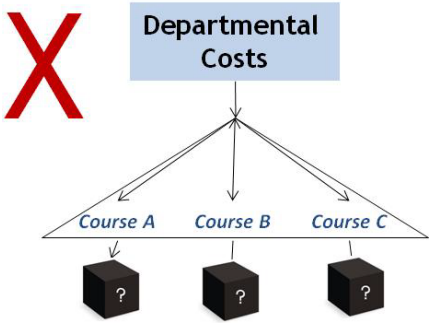
The cost of a course serves as the basic building block for institutional planning as it can be rolled up to provide the total cost of running a department or program. It can be used by Deans or Department heads to analyze their course portfolios and make comparisons across various portfolios. It also allows campus leadership to understand the total cost of running their educational enterprise. However, high level course cost information by itself does not help in the analysis of potential course transformation and analysis. For this, courses have to be broken down by activity categories, such as those outlined in **Figure 4**, in order to understand how resources are actually being expended. This methodology breaks up educational activities taking place for each course, which will assist faculty members and academic leadership in assessing opportunities for course improvements.

The activities outlined in **Figure 4** are recommended by the National Higher Education Benchmarking Institute (NHEBI) to be utilized by institutions to capture the educational activities related to courses. While institutions are free to use their own categories, for the sake of promulgating activity-based costing standards in the higher education industry, the use of standards already developed is preferable.[10]

[10] These activities are also being utilized by grantees of the Bill and Melinda Gates Foundation in each of their activity based costing projects and should continue to be utilized to create a common cost framework going forward for the Foundation's work.

Figure 4: Course Level Direct Activities		
	Activities[11]	Description
1	Course Development	Creating and planning curriculum, pedagogy, instruction, and delivery methods to guide student learning.
2	Course Management	Planning learning activities, selecting and creating course content and materials, engaging in course organization.
3	Teaching	Delivering course content, managing and monitoring student assignments and classroom (physical or virtual) activities.
4	Tutoring	Formally providing supplemental academic assistance in support of regular coursework.
5	Advising	Assisting students with activities related to their educational experience including scheduling, academic support, planning and selecting curricular pathways and career development.
6	Assessment and Grading	Assessing prior and current learning; developing and selecting assessment methodologies; evaluating student assignments and performance to award course credit, and contributing to broader assessment of student learning outcomes.

It is important that activity cost estimates are built from the bottom up to form total course cost estimates, as displayed in **Figure 5** below. If they are not, what you are left with is allocating total current expenses to activities, which makes total expenses fixed, and the cost per course a black box. "With cost preceding rather than following activity, departmental production function becomes fixed rather than variable and the activity itself is assumed to be beyond analysis."[12] In order to enable institutions to look at their processes as something they can make more effective, the cost of each activity must be calculated from the bottom up. That is, estimates of time spent on each activity must be developed and aggregated up, instead of allocating total expenses down to activities.

Yes to Bottom Up Activity Based Course Costing	Figure 5.	Not Top-down Cost Allocation
	***"With cost preceding rather than following activity, departmental production function becomes fixed rather than variable and the activity itself is assumed to be beyond analysis."[10]***	

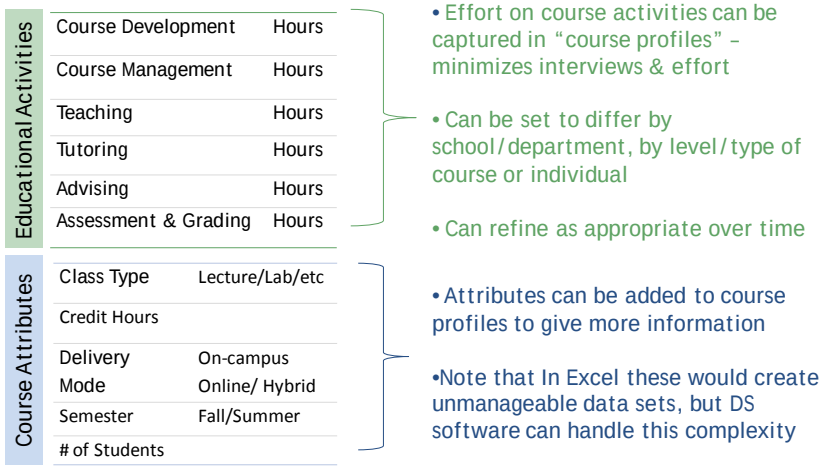
[11] All direct course activities and their descriptions from National Higher Education Benchmarking Institute (NHEBI)

[12] Massy, 2003.

Step 3: **Allocate direct costs to courses/programs through a cost driver based allocation strategy**

Once the educational activities have been identified, the next step is to allocate the proper cost to each activity. Again, the idea is not to allocate total departmental costs to each activity, but rather to start with estimates on the time it takes to complete any given activity. This requires understanding how much time it takes to accomplish an activity and an estimate of the personnel cost attached to that time. Time involved in each activity can be difficult to obtain given the large amount of courses at any given institution. In order to alleviate this data requirement, one solution is to create broad course profiles that would have average times per activity associated with them. Institutions could create course profiles by type of class, such as lab, seminar, or lecture. Course profiles could also distinguish between academic areas. Course profiles allow institutions to start along the path of cost allocation more quickly than if activity data needed to be collected for every single course offered. As institutions become more sophisticated and experienced in the use of this costing methodology, they can revisit their original course profiles and create more nuanced profiles as necessary.

Figure 6. Sample Course Profile & Attributes



The second piece of this puzzle is the personnel cost involved and how to express this cost as a standardized (e.g. hourly) rate. Once this is accomplished, then the cost of the activity can easily be calculated by the product of the hours per activity and the personnel cost per hour. The personnel cost associated with direct course activities will normally be faculty and teaching assistants, but could include a number academic personnel. In addition, within the faculty category, there are various categories that an institution may want to track separately for costing purposes, for example, adjuncts vs. tenured faculty. The categorization of personnel associated with courses is up to each institution. However, the cost per hour per faculty member must include both total salaries and benefits, adjusted for any percentage of time allocated to the institution's other service lines, such as research or public service. As described in **Section 4:** Faculty workload, there are a variety of methods that can be utilized to allocate the cost of faculty time.

Cost allocation at this detail was nearly impossible to do in the past, as historically, such calculations would have had to be done using tools such as excel which could not handle the enormous amount of information required for this methodology to work. However, decision support and analytics software is now available that can handle large amounts of data and can automate cost allocation. **Figure 7** outlines

the total direct cost calculation for each course. It is the sum of the activity hours times the appropriate per hour rate. Each course can then be rolled up to obtain the total direct costs per school or department. In addition, non-financial metrics can be included to create metrics and measure desired outcomes. The difficult part of this exercise then becomes not the technical piece, but rather the collaboration piece. Working with the right constituents on estimating activity levels, their associated resource requirements, and how these vary with different drivers is a challenging but crucial step.

Figure 7. Sample Course Cost with Instructional Breakdown

School of Business

Course 1	Hours	% Total	Expense	Faculty FTE	FT Students
Course Development	Hours	10%	$$$	XX	XX
Course Management	Hours	20%	$$$	XX	XX
Teaching	Hours	40%	$$$	XX	XX
Tutoring	Hours	20%	$$$	XX	XX
Advising	Hours	10%	$$$	XX	XX
Assessment & Grading	Hours	10%	$$$	XX	XX
Total			$$		

Course 2 - 100

School of Liberal Arts

School of Medicine

School of Engineering

Activity hours are combined with HR/financial data to Calculate total expenses

Non-financial information can be included to create specific metrics

While total cost per course information is great for institution wide reporting and planning purposes, it is the lower level activity based information that is needed when working on course redesign. Illustrating this point is the work of Dr. Carol Twigg at the National Center for Academic Transformation. Her work involves using technology to improve course learning outcomes while reducing costs to institutions. In order to compare the cost of the status quo course with the cost of the redesigned course, the Center leverages activity based costing. They identify all personnel costs; the tasks associated with preparing and offering the course in the traditional format and the redesigned format and then figure out how much time each type of personnel spends on each of the tasks. This task allows faculty members to consider changes in instructional activities (such as how to leverage technology (or not)), understand any duplicative or unnecessary effort going on and actually run a cost/ benefit analysis on changes in any particular course. NCAT has helped redesign 120 courses, reducing costs by an average of 37 percent (range of 9 percent to 77 percent).[13] NCAT's cost work, however, is highly manual, relying on excel sheets and is only collected for the particular course that is being redesigned. Thus, it constitutes a one-off exercise that is difficult and expensive to replicate.

The proposed cost methodology addresses this issue and prepares institutions for this type of transformative work by calculating the status quo cost per course for the entire institution. Because this data is kept in decision support software, it can be made a normal part of operations making periodic updates available at the touch of a button. In addition, it allows campuses to model out cost differences in any course redesigns quickly, making replication across the institution easier.

[13] Center for Academic Transformation website, http://www.thencat.org/PCR/R3/BYU/BYU_Overview.htm,

It is important that institutions use the same foundational educational activities for all course types. Other information about the course can be added in as an attribute using the cost allocation software. So for example, information on the type of course, whether it delineate between classroom experience (clinical, lab, lecture), type of instruction (remedial, developmental or credit courses) or even student type (undergraduate or graduate) can always be added to the course description using the decision support software. The educational activities are what need to be captured from a labor and time estimate perspective and any additional information can be added as attributes or extra course information. (See **Figure 6**)

Case Study: National Center for Academic Transformation BYU Writing Course Redesign[14]

Brigham Young University (BYU) redesigned its first-year writing course, which enrolled approximately 2,950 students in about 166 sections each academic year. The course was originally taught primarily by graduate instructors in the English MA program and suffered from problems of inconsistency and inefficiency; student evaluations revealed a wide range of quality. The instructors tried to achieve course objectives in a multitude of ways, and their inexperience led them to spend a significant amount of time preparing for classes, duplicating the efforts of others. The redesign planned to reduce the amount of time students spent in the classroom from three hours to one hour per week. A series of interactive multimedia lessons, more one-on-one time with faculty, and additional peer-to-peer sessions were developed to replace the time students used to spend in class. These lessons were designed to standardize the curriculum across all sections, provide students with a more consistent experience, and reduce the time graduate instructors spent preparing and presenting in the classroom. Because students will receive more feedback on their work in progress, the result will be improved student learning. The redesigned course anticipated a reduction in instructional costs by decreasing the total hours each instructor spent teaching the course, increasing class size from 20 to 25, and reducing the hours needed to train and supervise new instructors. The cost-per-student was anticipated to drop from $205 to $122, an estimated cost savings of 40%. Savings were used to offer enough additional sections to meet student demand, to provide a steady source of funding for advanced writing sections and to improve training of part-time faculty. For more case studies in other academic areas, go to the NCAT website at, http://www.thencat.org/PCR/Proj_Desc.htm.

Step 4: **Create Educational Indirect Cost Buckets by identifying all relevant indirect activities**

The direct cost allocation is all that is needed by institutions to complete course redesign and efficiency work. However, from an institution-wide perspective, all costs should be allocated if the *fully loaded* cost of providing students with instruction is to be calculated. Indirect costs should not be spread like peanut butter, with an even spread among all courses. Different costs have different cost drivers and any cost allocation methodology must acknowledge these differences. For example, while career service costs are driven by the number of students using the service, facilities costs are driven by square footage usage. In addition, expenses should be broken out by type so that each in turn can be analyzed separately for efficiency opportunities. Lumping all expenses together leads to the same problem as when educational costs are lumped together, the expenses are seen as fixed instead of something that can be analyzed and improved. There are many ways to categorize indirect costs. This paper lays out a potential categorization

[14] Case study from the National Center for Academic Transformation website, http://www.thencat.org/PCR/R3/BYU/BYU_Overview.htm, which details all their course redesign work at various institutions.

that is driven by both type of expense category and by activity, as detailed in **Figure 8.** (See definitions outlined in **Appendix C**).

These categories allow the institution to create high level categories of expenses as well as the flexibility to analyze the specific activities within each category type. However, institutions should use whatever categorization works best for them and this list can serve as a springboard to start conversations at any given campus.[15]

Figure 8: Indirect Cost Categories

Type of Expense	Activity	Type of Expense	Activity
College or Departmental Overhead	Academic Administration	**Student Services**[16]	Admissions (mktg/recruiting)
	Other Administration		Advising
	Facilities & Space		Tutoring
	Other Expenses		Counseling
Academic Overhead/Academic Support	Academic Administration		Career Services
	Faculty Development		Student Assessment/Testing
	Information Technology		Financial Aid Admin.
	Library Services		Student Support IT
	Facilities & Space		Other Student Activities
	Other Academic Support		
	Executive Management		
Institutional Overhead	Administration (HR/IT/Finance/Legal)		
	Alumni/Development		
	Facilities & Space		
	Other Institutional Overhead		

Step 5: Allocate indirect costs to courses/programs through a cost driver based allocation strategy

Once the types of categories and activities are agreed upon, the next step is to allocate the costs out to each course in order to calculate the fully loaded cost. As mentioned in Step 4, it is important that these costs all not be spread evenly among courses. Rather each category and activity should be analyzed separately and assigned appropriate cost drivers. Facilities costs could be allocated based on the square footage utilized by department or school, while many of the student service costs could be allocated based on total percentage of students served. Below are sample cost allocation drivers that can be utilized to spread costs out to indirect cost categories.

[15] Since these categories are not the same categories as the ones utilized by institutions for F&A rate proposals, care should be take to review and reconcile this information back to the F&A rate proposal, where possible. While the particular indirect cost categories are different, the overall costs for facilities and administration should be consistent with the F&A proposal.

[16] All Student Service category definitions are attributable to IHEP (Institute for Higher Education Policy) recent activity based costing project sponsored by the Bill and Melinda Gates Foundation

Figure 9: Indirect Cost Categories		
Type of Expense	**Activity**	**Cost Driver/Allocation Methodology**
College or Departmental Overhead	Academic Administration	# of FT Staff
	Other Administration	# of FT Employees
	Facilities & Space	Square Footage Utilized
	Other Expenses	Remaining Expenses
Academic Overhead/Academic Support	Academic Administration	# of Faculty
	Faculty Development	# of Faculty
	Information Technology	# of FT Employees
	Library Services	# of Faculty + # of students
	Facilities & Space	Square Footage Utilized
	Other Academic Support	# of Faculty
Institutional Overhead	Executive Management	# of FT Employees
	Administration (HR/IT/Finance/Legal)	# of FT Employees – This could be broken out further depending on administrative function
	Alumni/Development	# of FT Employees
	Facilities & Space	Square Footage Utilized
	Other Institutional Support	# of FT Employees
Student Services[17]	Admissions (includes marketing/recruiting)	# of FT Students
	Advising	# of FT Students
	Counseling	# of FT Students
	Career Services	# of FT Students
	Student Assessment/Testing	# of FT Students
	Financial Aid Admin.	# of FT Students
	Registrar	# of FT Students
	Student Support IT	# of FT Students
	Other Student Activities	# of FT Students

The advantage to having varying cost drivers for different support costs is that they enable detailed benchmarking. For example, if student advising costs per student are captured, institutions will be able to compare this cost metric with desired student outcomes. This information could then be utilized to help inform decisions on what to do with student advising to improve outcomes. As another example, having

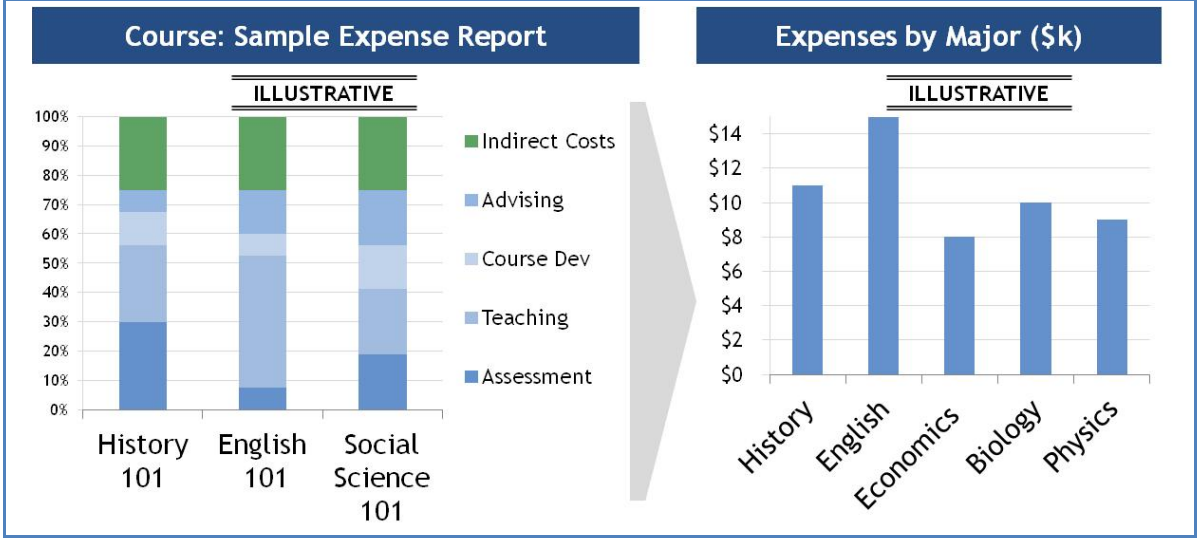
[17] All Student Service category definitions are attributable to IHEP (Institute for Higher Education Policy) & JCCC (Johnson County Community College) recent activity based costing projects sponsored by the Bill and Melinda Gates Foundation

information on space costs could incentivize departments to maximize their space utilization to reduce their departmental costs.

Final Outcome

Once Steps 1-5 are completed, institutions will have a fully loaded cost per each course. The methodology calculates costs at the course level but rolls-up easily to total departmental costs and total major costs (See sample expense report in **Figure 10**). This data can also be combined with the non-education costs to achieve an institution wide overview.

Figure 10: Sample Expense Report



This methodology places emphasis on cost per course and course level activities. This is not because it is assumed that instructional costs are bloated or inefficient or even the largest portion of university expenses. The reason this design is to expand on the academic administrative toolkit. Currently, there are very few administrative tools available for faculty to examine instructional costs. When this type of information has been collected, it has been a very time-consuming and manual process (see NCAT course redesign process noted previously). This cost methodology is designed to make instructional cost information a regular part of operational reporting. Although the methodology is also designed to improve overall institutional planning and forecasting, its uniqueness from other planning tools is its ability to dissect course activity. Thus, it serves as both a tool for planning administrators and for faculty.

Section 4: What information and infrastructure is needed?

Good G/L design:

One foundational component for implementing good activity based costing is to ensure that you have good general ledger design. The general ledger, although primarily a transaction engine and not a data analytical tool, still has to be designed to provide quality and useful financial information. Many still see the G/L as something that only central accounting cares about. However, a well-designed G/L can be used to standardize financial data across decentralized institutions, eliminate duplicative reporting efforts, and should be seen as an enterprise-wide strategic initiative. [18] The pieces of the general ledger design that are critical to the pursuit of cost per course data are as follows:

- *Account detail* – Key among G/L design is to make sure it is not overburdened with too much detail. Account information, that is the detail behind revenue, expenses and balance sheet line items must be considered carefully. Many institutions have made the mistake of including every possible detail that someone would want to track, only to end up with an unmanageable G/L. An overwhelming amount of detail makes people default to the "other" category leaving the institution with little useful data on revenues and expenditures. Legacy charts of accounts also sometimes do not have hierarchies that are useful for management purposes. For example, expense types have thousands of line items associated with them, but they don't roll up to broader strategic categories that can quickly inform managers on expenditure trends. Instead they are buried in mountains of detail. This problem can be alleviated by building in hierarchies that roll up to useful management categories as well putting in control mechanisms to stop the proliferation of account detail.

- *Department or Cost Center Creation*: One of the key issues for institutions to think about as they review their chart of accounts is to consider the level to which they are capturing and/or would like to capture cost center data. Sometimes multiple departments are captured under one cost center, making it much harder to separate the expenses of each and therefore making it much harder to allocate costs to specific courses. For example, a biology department could have a sub-molecular biology department and an entomology department but only one biology "cost center." With two cost centers, rolling up to a "parent" biology cost center, the institution can analyze the cost of both sub-departments. With the ability to roll up and drill down, institutions understand not just the cost of their individual courses, but can also quickly allow departments and schools to see a complete picture of their total resources. Ideally, a deep dive of the institution's cost centers or departments would be completed before embarking on any cost per course cost

[18] Accenture, 2003.

allocation project. It is also important that department codes keep up with organizational changes. When configurations change, as they often do, the chart of accounts has to change as well.

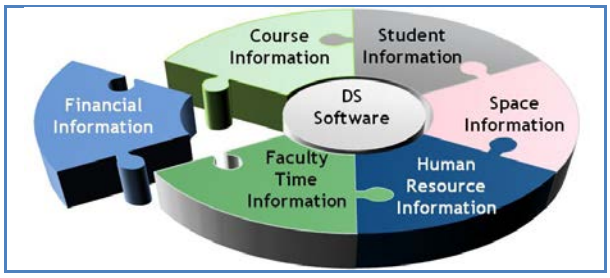
- *Program*: In the chart of accounts, the purpose of this field is meant to associate transactions with a formalized set of on-going activities. To the extent that any department is part of a larger campus-wide program or an institution wants to track the costs of a particular set of activities, this field allows for the quick aggregation of expenses for that program. Program in this case does not mean "major" or "program of study" and for the most part represents an additional field in the chart of accounts, outside of the cost per course calculation.

- *Funds:* Colleges and universities use an accounting method commonly referred to as fund accounting. Fund accounting classifies all resources into funds according to specific limitations placed on their use by the resource providers. The fund classification recognizes the financial responsibility inherent in accepting restricted resources from external parties. While the ability to differentiate between funding sources for fiscal stewardship purposes will continue to be necessary, many institutions suffer from an unnecessary proliferation of funds. Some institutions have created thousands of funds, mostly due to the misuse or misunderstanding of the chart of accounts. Most commonly, institutions use fund to capture cost center or departmental information, or to keep track of specific projects. This causes duplication and unneeded complexity in the chart of accounts. Institutions must work to reduce the amount of funds it has as much as possible before attempting to implement this cost framework. It is possible to take proliferation of funds and simplify it for use in a model by building lookup tables. For example, thousands of fund lines could be distilled to a key few that are displayed in the model. This could be done while data systems catch up. By building lookup tables the tools that import source data would be able to account for the simplification until such point as the data systems catch up.

- *Application of Indirect Costs*: While indirect costs can be applied using the cost allocation methodology laid out in the **Cost Framework** section above, it could be helpful to pre-allocate some indirect costs to appropriate cost centers within the general ledger. This is optional as this work could also be done by cost allocation software as mentioned in the section below.

Non-Financial Data

Figure 11: Financial Information is only one piece of the puzzle



Financial data is only a piece of the puzzle when it comes to this cost per course methodology. In order to do cost allocation properly, access to a variety of non-financial data is needed, such as space, payroll, course, and student information. This information, along with the cost drivers, will be combined to help calculate the cost per course. While this can be a very complex task and is one of the reasons that this type of methodology has not been widely utilized historically, new decision support software products available in the marketplace make it fairly easily and automatic to combine these disparate data sources.

However, the difficulty of obtaining good data should not be taken lightly. Integrating disparate data sources will probably prove to be the most difficult part of implementing this methodology. Different data sources tend to have different definitions for similar sounding values and ensuring that the data is comparing apples to apples will be an important first step of this endeavor. The importance of good data cannot be overemphasized. Below is a description of the type of data that will be needed by institutions to implement this costing methodology:

- *Space and Location information:* Most colleges and universities have a space or facilities management system, although they can be widely varied in the extent of their sophistication and completeness of information. Ideally the information that you would want to pull from this sort of system would be the building name or number, the number of rooms and room type (e.g. lab, lecture hall, conference room), square footage and its capacity. This information is critical in understanding the true cost of facilities utilized for courses. The different types of classroom, such as lecture halls and labs have different resource needs and therefore different costs. Improving course cost efficiency has as much to do with maximizing physical resources utilized as analyzing the educational activities, so capturing the cost of space is a key part of total course cost. This information will allow the creation of facility utilization and space capacity metrics. It should be noted that this type of methodology can be implemented even if the institution does not have all the space information outlined above. More generic information can be used to allocate space costs, however, the ability to create space efficiency metrics would be lost without the detailed information. Many institutions calculating F&A Cost Rate proposals already have the detailed room by room information readily available. In this case, this information be leveraged and reconciled to ensure consistent reporting throughout the institution.

- *Payroll/HR* – Institutions need to keep payroll and human resource information in a system or database that has a sufficient amount of information at a detailed enough level to include the following information: type of employee (academic, adjunct, non-academic, staff) and function (for administration this could be IT, HR, finance, etc), salary and fringe benefits and the department to which they report. This information will be utilized for both direct and indirect cost allocations.

For faculty, payroll salary and fringe cost information will be allocated first to the service lines they participate in (e.g. public service, research, teaching). Once the teaching percentage of their time has been decided, it can be allocated to courses based on the number of hours spent on the various educational activities they participate in for each course. Depending on the institution, differentiating full-time faculty by seniority, permanent or temporary status and tenure status could also be important for the quality metrics that should also be created and analyzed in parallel with the cost information.

For administration it is especially important that function be captured. As cost components are defined, it is important to clearly delineate all the assumptions surrounding each, especially personnel costs associated with each cost bucket. This will help identify opportunities for cost reduction in the future, especially in administration where there are already well-established industry metrics from the business community. For example, an institution could capture total HR costs and create metrics comparing the number of HR personnel per employee to established best practices from outside higher education. The authors of Improving Measurement of Productivity in Higher Education also call out this issue as one of their recommendations for changes in higher education. Recommendation five states "The National Center for Education Statistics (NCES) or a designee should examine the feasibility of (a) modifying university accounting systems and IPEDS submissions to identify FTEs by labor category, as ultimately specified for the model, according to the function to which they are charged; and (b) calculating total compensation for each category and function." If this change is made by IPEDs it will make comparing the cost of these activities by institution much easier. Even if it's not adopted by IPEDs, having the technological infrastructure, such as a good HR ERP system, will allow institutions to collect this data for their own use.

- *Course Information System* – Higher education institutions need a robust course information system. The information needed from this system would include the course name and number, the corresponding school or department, the room, the number of people enrolled in the class as well as the instructor information. While not all institutions connect courses to specific instructors, they should begin to do so, to the extent their systems allow it, prior to implementing this costing methodology. By enhancing the CIS to include identifiers for instructors, it creates an authoritative crosswalk between activities and resources. It also would be advantageous for the tracking of faculty workload.

One key to identifying possible cost saving opportunities for institutions is to compare the number of people enrolled in the course with the room size in which the course is taught. Running statistics and metrics on institutional room capacity and enrollment numbers per course could help identify any underutilization of space and therefore help reduce costs by targeting ways to maximize space use. It is also information that helps to compare the same course run at different locations or semesters allowing for benchmarking. For example, are the average enrollments different? Average class size? Decision makers can use this information to do more effective planning. In addition, this is where you would capture the course attributes information. For example, type of class (lab lecture, etc.); delivery mode (online, on campus, etc.); semester, remedial vs. credit; etc.

- *Student Records* – Student records should also be accessible, including student number, major, and course enrollment. Student data would of course be kept anonymous, but linking the student to the specific credit hours taken and major is crucial. This information is already kept in most institution's student registration files but is not normally used for costing purposes. Student information would be used to get student counts by type for course instances and to facilitate driving course costs to the appropriate programs. This course to program relationship is particularly important for elective courses which are often delivered by one department but taken by students who belong to a program "owned" by a different department. This data would allow the institution to track not just the cost per course per student but the overall cost of programs. For example, a bachelor degree granting institution could calculate what it costs to offer a biology major. This information would help not just in budget planning but for course offering planning as well. By knowing what majors existed in the freshman class for example, the institution could plan for what classes it would need to provide, when and at what cost.

- *Faculty workload* – This could be gathered in a sophisticated way by time use surveys or it can be done using less formal methods. The formal method includes timekeeping tools/software that can be used for faculty to track of their time. However, these tend to be unpopular with faculty as faculty mistrust both the administrator's motives in collecting the time use survey data and the motives of any external stakeholders who may have access to the data and believe faculty are not teaching enough. Due to the fact that professors are wary of this type of data collection, the information collected may not be accurate and may even be biased.[19] The fact is that precise time surveys are not needed to complete this analysis and it is recommended that a less formal managerial estimate methodology be utilized. It is better to use rougher informed managerial estimates that are focused on average time spent per activity. Time estimation in this case will be more about making value judgments, than to get a precise measurement. Ultimately, since this information will be contained in cost allocation software, it can be refined and tweaked over time as faculty develop better activity estimates. In addition the workloads would be extensible and configurable at any level of the institution, so if one school or department wanted to set a different faculty workload to another then that be possible. However, institutions could start with generic faculty workload profiles and refine them over time. The collection of faculty work-load should not be taken as a one-time exercise but rather as an evolving process, where faculty can modify the estimates over time based on actual experience.

Cost, Performance and Predictive Modeling Software:

In order to for an institution to rapidly implement an activity based costing solution, it will need software with the capability to automate the cost allocation and integrate all the data outlined in the section above. The software will have to be able to integrate financial data, human resource data, course information, and student records, as well as contain the cost allocation assumptions and drivers.

[19] Massy, 2003

In fact, one of the reasons that this type of costing methodology has not been attempted by more institutions is that the data needed to calculate the cost per course is so immense that it would be very difficult to do using the traditional tools for finance professionals such as Microsoft's Excel or Access. However, companies such as Oracle and the Pilbara Group have recently designed software fitted to the post-secondary education setting that would allow the data integration and cost drivers to be automated. This type of software has powerful multi-dimensional analysis capabilities enabling institutions to slice and dice data in ways that were not possible in the past or only after hundreds of hours of data manipulation. Most importantly, this software makes it possible to make the cost per course data replicable and systematic, enabling it to be part of an organization's periodic reporting and culture.

Section 5: Benefits of this Costing Approach

This model is meant to enable institutions to use a data-driven approach in their decision-making as they look forward to accomplishing their strategic vision and goals. It has become a business imperative that the industry have access to this type of cost information. In a recent survey of college and university business officers by Inside Higher Ed and Gallup, barely a quarter of campus chief financial officers (27 percent) expressed strong confidence in the viability of their institution's financial model over five years, and that number dropped in half (to 13 percent) when they are asked to look out over a 10-year horizon. Institutions are looking to maximize the use of their resources, but only 34 percent of CFOs agreed that they had sufficient information to judge administrative units, and 42 percent said the same about academic programs and majors. [20]

This methodology, combined with business analytics technology, will provide institutions with the ability to not only produce ongoing cost information about their entire operations, but ultimately to also serve as a campus wide planning tool that can inform resource allocation.

Reporting & Operational Reform:

One of the benefits of implementing this methodology is that it will provide institutions with more transparency around the costs of its operations. It will give school and departmental heads the ability to analyze the cost of their programs. In addition, by aggregating course information to student majors, administrators will also know what students are doing across the curriculum, not just in their home school or college.

This information, when turned into benchmarks and combined with quality and outcomes based metrics can also help support program reviews and help spot administrative efficiency opportunities. This, in fact, is key to gaining academic (CAO/provost) buy-in and trusts on this methodology. The integration of non-cost metrics make the model useful to non-financial personnel as it allows academics to examine the relationship between outcomes and cost.

[20] Inside Higher Education Business Officer Survey (2013).

Benchmarking on course data also helps departments analyzes their operations. For example, a department could compare the same course run at different locations or semesters to identify key information such as average enrollments, average class size and other information that may affect planning.

Benchmarking can also be used for non-academic operational purposes. Linking data sources also allows the creation of non-financial metrics that can be useful. When space and scheduling data is linked, it can show how many students are attending a course section within a particular room and how often the room is being used. This allows analysis of facility utilization and shows spare capacity which is extremely useful as a metric.

With the ability to evaluate trends and ongoing operational benchmarks over a period of time, institutions can take a more focused approach to financial and operational reforms. This data will help inform decision making on reallocation of resources and strategic cuts. A recent McKinsey study showed that no matter the industry, companies that actively reallocate their resources perform better than those who do not by a substantial margin.[21] While higher education is for the most part not a profit driven industry, I think the key take-away from the study is that the willingness to reallocate resources, both existing and new, is a key factor of a dynamic top team. As institutions look to accomplish strategic goals with limited resources, it becomes more of an imperative that resources are effectively deployed.

In addition, while the model itself has a significant level of complexity, a key element of this strategy is that it enhances transparency in the internal allocation of resources and costs, helping provide appropriate budget discipline that all stakeholders understand and accept.

Planning and Predictive Analysis:

Effective strategic planning requires a disciplined effort to produce fundamental decisions and actions that shape and guide where an organization wants to go. It requires institutions to create a framework for long-range thinking and organizational change as well as improved understanding and dialogue about the institutional vision that fosters a sense of ownership in the strategic plan. Without this foundation, no cost methodology will be effective in helping inform decision making.

However, if an institution is ready, this methodology does play a key part in helping inform decision making. This data enables institutions to do predictive analytics and run various "what if" scenarios based on different strategic choices. [22] Since information on the resource requirements of any changes will be known, this methodology will facilitate strategic enrollment management as well as academic planning across the institution.

[21] McKinsey Quarterly (2013).

[22] There already exist a number of institutions, including the University of Sydney in Australia that have successfully built predictive models using a similar methodology and use them to assist in strategic planning.

Currently, many institutions have the ability to run financial models that calculate the estimated revenue and expense effects of institution wide salary increases, changes to government funding, and changes in tuition. While this is great functionality for institutions, fundamentally, it is based on the old black box, fixed costs methodology and does not help institutions with strategic enrollment and program questions. This methodology enables planners to estimate the fiscal effects of varying changes or growth in student enrollment or changes to curriculum, whether it is changes to existing courses, new courses or program removal in a more effective manner. After all, making a decision to increase enrollment in the pre-med program by 1,000 students has a very different effect in terms of resource requirements (such as facilities costs and faculty time) than a decision to increase transfer student enrollment by the same amount. Another common area of interest among many institutions is restructuring curriculum to make it more cost effective and streamlined. If difficult decisions or trade-offs need to be made, institutions will have the cost related data to help inform their decision-making.

Finally, institutions that do responsibility center management may want to use this data to do course or program margin analysis. This would require allocating the institutional revenues and can be done using the same cost allocation software. Depending on the method of data capture for revenue, there are a variety of different ways to distribute revenue to courses. The exact methodology would be an institution specific decision.

Clay Christensen, the father of the theory of industry disruption, posits that "higher education is just on the edge of the crevasse."[23] Christensen believes that universities will have to find innovative, less costly ways of performing their uniquely valuable functions to ensure their ongoing financial vitality. In order to navigate the uncharted waters of the change tsunami hitting higher education, institutions will need access to sophisticated tools that will help support strategic decision making and this costing methodology could serve as an important part of that tool kit.

[23] Business Insider, (2013).

References

Accenture (2003). *A new look at the Chart of Accounts.*

Business Insider (2013). *Higher Education is on the Edge of a Crevasse*. http://www.businessinsider.com/clay-christensen-higher-education-on-the-edge-2013-2

Center for Academic Transformation.

Delta Cost Project. College Spending in a Turbulent Decade, A Delta Data Update. 2010.

Inside Higher Education (2013). *The 2013 Survey of College and University Business Officers*.

Hay, Leon E. (1980). *Accounting for Governmental and Nonprofit Entities, Sixth edition*, page 5. Richard D. Irwin, Inc., Homewood, IL.

Higher Education Act of 1965, Title IV, as amended (20 U.S.C. 1094, Section 487(a)(17) and 34 CFR 668.14(b)(19)).

Massy, Bill (2003). *Honoring the Trust: Quality and Cost Containment in Higher Education.* Anker Publishing Company.

McKinsey Quarterly (2013 Number 4). *Never let a good crisis go to waste.*

McPherson and Shulenburger (2010). *Understanding the cost of public higher education*. Planning for Higher Education 38(3): 15-24. 2010.

National Center for Academic Transformation website. http://www.thencat.org

National Higher Education Benchmarking Institute. http://www.nccbp.org/

National Research Council (2012). *Improving Productivity measures in Higher Education*. National Academy of Sciences.

Appendix A: Segmentation by Institutional Type

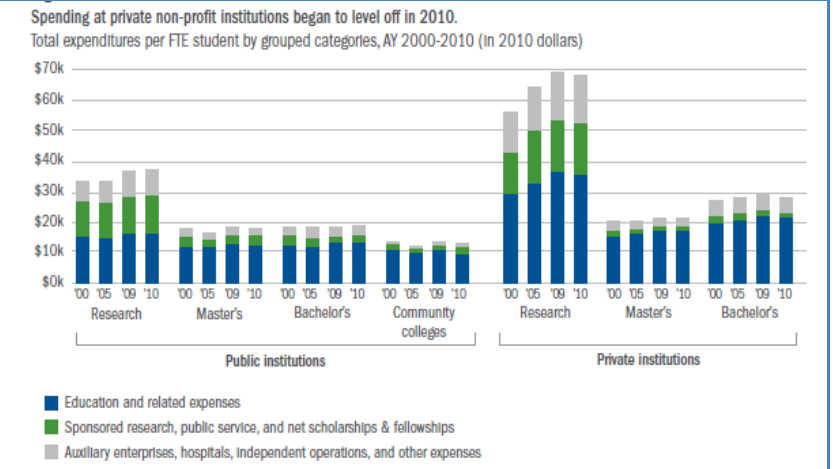
As it would not be appropriate to compare cost and performance measures across institutions with different missions, segmenting any cost analysis by institutional type is a prerequisite to accurate interpretation.

For purposes of this paper, the approach established for the Delta Cost Project has been utilized with three major adjustments. The Delta Cost Project methodology is used widely for other national studies on cost and thus represents the most comparable cost information available. 24 They employ seven institutional groups: public research, public master's, public bachelor's, public community colleges, private nonprofit research, private nonprofit master's, and private nonprofit bachelor's. Given the high level spend trends for the identified Delta Cost Project institutional segments as displayed in Figure 2, it appears the segments have sufficiently different business models and cost structures to warrant separate analysis.

The three adjustments made to the Delta categories are as follows:

1. Private and public master degree granting institutions were merged into one segment. Based on the Delta Cost Project data, there doesn't seem to be a large difference in cost structure between the two institutional types. As such, it is more efficient to examine them as one category.

Figure 2: Delta Cost Project: Spending by HE Segment[25]



2. Addition of the for-profit segment. While not a traditional HE segment and not one that has been focused on historically, a cost structure analysis of the for-profit segment will offer insights that could be leveraged for non-profit institutions. However, it is important to note that for-profit institutions are highly varied and may need to be further segmented in future work.

3. Addition of stand-alone Breakthrough Delivery Models (BDMs) as their own segment. To the extent that these are independent operations, they operate under a different business model than any of the traditional segments and should be analyzed separately.

These adjustments leave the following 8 segments to be analyzed:

1) Community colleges 2) Public bachelor degree granting institutions 3) Private bachelor degree granting institutions 4) Public research universities 5) Public/Private master degree granting institutions 6) Stand-alone BDM 7) Private research institutions 8) For-profit degree granting

[24] The recent book by the National Academy of Sciences. "Improving Measurement of productivity in higher education," (2012), also uses the Delta Cost Project categories.
[25] Delta Cost Project. Spending: Where does the money go, A Delta Data Update. 2010.

While the cost allocation methodology framework in the Cost Framework Section below can apply to all segments, it is important to differentiate between the eight segments as they have very different cost structures and service lines. It is essential that cost and performance comparisons are not made across institutions with different missions and therefore different operating models. Segmenting any cost analysis by institutional type is essential for proper analysis.

Appendix B: IPEDs Functional Expense Category Information Collected & Definitions

IPEDS Functional Expense Category Definitions[26]	
1. Instruction	A functional expense category that includes expenses of the colleges, schools, departments, and other instructional divisions of the institution and expenses for departmental research and public service that are not separately budgeted. Includes general academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and regular, special, and extension sessions. Also includes expenses for both credit and non-credit activities. Excludes expenses for academic administration where the primary function is administration (e.g., academic deans). Information technology expenses related to instructional activities if the institution separately budgets and expenses information technology resources are included (otherwise these expenses are included in academic support). Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.
2. Research (if applicable)	A functional expense category that includes expenses for activities specifically organized to produce research outcomes and commissioned by an agency either external to the institution or separately budgeted by an organizational unit within the institution. The category includes institutes and research centers, and individual and project research. This function does not include non-research sponsored programs (e.g., training programs). Also included are information technology expenses related to research activities if the institution separately budgets and expenses information technology resources (otherwise these expenses are included in academic support.) Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.
3. Public service (if applicable)	A functional expense category that includes expenses for activities established primarily to provide non-instructional services beneficial to individuals and groups external to the institution. Examples are conferences, institutes, general advisory service, reference bureaus, and similar services provided to particular sectors of the community. This function includes expenses for community services, cooperative extension services, and public broadcasting services. Also includes information technology expenses related to the public service activities if the institution separately budgets and expenses information technology resources (otherwise these expenses are included in academic support). Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.
4. Academic support	A functional expense category that includes expenses of activities and services that support the institution's primary missions of instruction, research, and public service. It includes the retention, preservation, and display of educational materials (for example, libraries, museums, and galleries); organized activities that provide support services to the academic functions of the institution (such as a demonstration school associated with a college of education or veterinary and dental clinics if their primary purpose is to support the instructional program); media such as audiovisual services; academic administration (including academic deans but not department chairpersons); and formally organized and separately budgeted academic personnel development and course and curriculum development expenses. Also included are information technology expenses related to academic support activities; if an institution does not separately budget and expense information technology resources, the costs associated with the three primary programs will be applied to this function and the remainder to institutional support. Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.
5. Student services	A functional expense category that includes expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the

[26] http://nces.ed.gov/ipeds/glossary/

IPEDS Functional Expense Category Definitions[26]	
	formal instructional program. Examples include student activities, cultural events, student newspapers, intramural athletics, student organizations, supplemental instruction outside the normal administration, and student records. Intercollegiate athletics and student health services may also be included except when operated as self-supporting auxiliary enterprises. Also may include information technology expenses related to student service activities if the institution separately budgets and expenses information technology resources (otherwise these expenses are included in institutional support.) Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.
6. Institutional support	A functional expense category that includes expenses for the day-to-day operational support of the institution. Includes expenses for general administrative services, central executive-level activities concerned with management and long range planning, legal and fiscal operations, space management, employee personnel and records, logistical services such as purchasing and printing, and public relations and development. Also includes information technology expenses related to institutional support activities. If an institution does not separately budget and expense information technology resources, the IT costs associated with student services and operation and maintenance of plant will also be applied to this function.
7. Operation and maintenance of plant	A functional expense category that includes expenses for operations established to provide service and maintenance related to campus grounds and facilities used for educational and general purposes. Specific expenses include utilities, fire protection, property insurance, and similar items. This function does include amounts charged to auxiliary enterprises, hospitals, and independent operations. Also includes information technology expenses related to operation and maintenance of plant activities if the institution separately budgets and expenses information technology resources (otherwise these expenses are included in institutional support). Institutions may, as an option, distribute depreciation expense to this function.
8. Scholarships and fellowships (expenses)	That portion of scholarships and fellowships granted that exceeds the amount applied to institutional charges such as tuition and fees or room and board. The amount reported as expense excludes allowances and discounts. The FASB survey uses the term "net grants in aid to students" rather than "scholarships and fellowships."
9. Auxiliary enterprises expenses	Expenses for essentially self-supporting operations of the institution that exist to furnish a service to students, faculty, or staff, and that charge a fee that is directly related to, although not necessarily equal to, the cost of the service. Examples are residence halls, food services, student health services, intercollegiate athletics (only if essentially self-supporting), college unions, college stores, faculty and staff parking, and faculty housing. Institutions include actual or allocated costs for operation and maintenance of plant, interest and depreciation.
10. Other	All other expenses.

Appendix C: Indirect Cost Categories & Definitions

Indirect Cost Categories & Definitions		
Type of Expense	**Activity**	**Definition**
College or Departmental Overhead	Academic Administration	Activities concerned with management and planning conducted within departments
	Other Administration	Any other local administration associated with any given department
	Facilities & Space	Costs allocated with facilities utilized by the administration of any given department including operations and maintenance costs
	Other Expenses	All other expenses
Academic Overhead/Academic Support	Academic Administration	Activities concerned with management and planning conducted within schools
	Faculty Development	
	Information Technology	Information technology expenses associated with school central administration
	Library Services	Providing support and access to information resources in printed and electronic formats to support academic activities.
	Facilities & Space	Costs allocated with facilities utilized by the administration of any given school including operations and maintenance costs
	Other Academic Support	Other expenses related to academic support
Institutional Overhead	Executive Management	Expenses associated
	Administration (HR/IT/Finance/Legal)	Central activities concerned with management and planning
	Alumni/Development	Costs associated with alumni relations and central fundraising functions.
	Facilities & Space	Costs allocated with facilities utilized by the institutional administration including operations and maintenance costs
	Other Institutional Support	Other costs associated with central administration
Student Services[27]	Admissions (includes marketing/recruiting)	Guiding potential students through the procedure of collecting, verifying, and evaluating credentials in the application process. Activities related to building awareness among potential students leading up to admission to the institution or a particular program

[27] All Student Service category definitions are attributable to IHEP (Institute for Higher Education Policy) & JCCC (Johnson County Community College) recent activity based costing projects sponsored by the Bill and Melinda Gates Foundation

	Advising	Assisting students with activities related to their educational experience including support with mastering course material, planning and selecting curricular pathways, and aligning coursework with career goals
	Counseling	Assisting students through personal support including coaching, mentoring, and counseling focused on non-academic issues
	Career Services	Assisting students with career planning, resume development, interviewing skills, job searches and partnering with potential employers
	Student Assessment/Testing	Administrating or proctoring of placement, proficiency, out of classroom, make-up, certification and standardized tests
	Financial Aid Administration	Assisting students with financial literacy, aid counseling and obtaining monetary support for the cost of attending college from sources other than the students and their families including scholarships, grants, loans and work-study programs
	Registrar	Assisting students with requests related to their academic records including transcripts, grades, appeals and verification of enrollment and progress toward receipt of degrees or certificates
	Student Support IT	Information technology expenses related to student services
	Other Student Activities	All other student services expenses