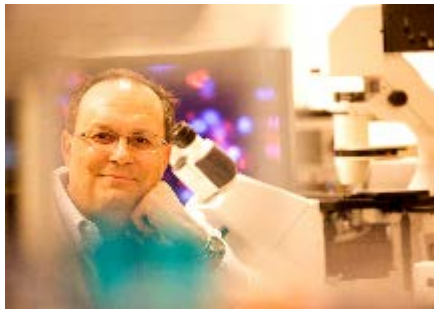
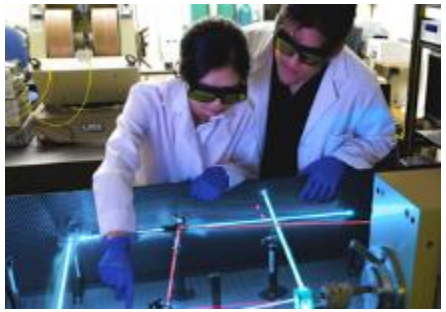
ABC (Activity Based Costing) and Course Optimization Project Kick-off

July 2015


Project Observers & Partners

Partners

Bill & Melinda Gates foundation

NACUBO

UCOP

Johnson County Community College

Deloitte.

Pilbara

Observers

University of California UC Merced

UC Davis University of California

Berkeley University of California

The California State University — Vox Veritas Vita — 1857

University Innovation Alliance

Purpose of Project

Empower *academic leaders, deans, department chairs and faculty members* ***with the analytical tools*** *required to innovate and redesign individual courses and/or* ***to optimize*** *college course portfolios to* ***improve student success****.*

Current Context:

The current national environment demands innovation to support student success and delivery of UCR's goals of Research, Access, Diversity and Engagement.

Current Realities

- *Pressure to improve student success*
- *Flattening revenue streams*
- *Rising costs*
- *Rising debt burden on students*

Conventional Wisdom

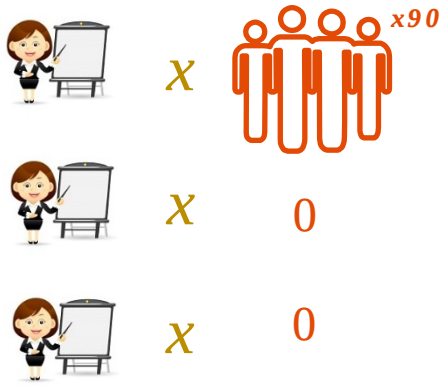
Better Outcomes = Higher Cost

How do we create the tools *to improve student success AND contain costs?*

Current data systems do not capture the information needed to answer strategic management questions

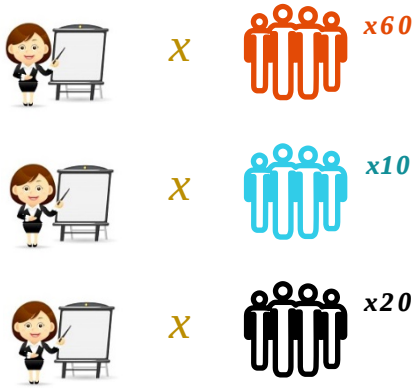
Given a fixed budget, what is the optimal mix for achieving the highest level of student success?

Scenario A



Scenario B

Scenario C



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Why cost matters to education innovators…

New learning methodologies are treated as one-off initiative expenses, not as part of a change in the operating model, making it difficult to effectively scale innovation

"Undergraduates can get 'turned off' in introductory science courses and never sign up for another one. For students to understand and become energized about science, they need to first participate in the discovery process."

—Susan Wessler
Creator: *Dynamic Genome Course*

Dynamic Genome Course :

- Sections: 12 /yr with proposed 24/yr in 5 years
- ***Undergraduates: 288 to increase to 576 in 5 year***

Improved Outcomes:

- Increased confidence in research skills and application
- Increased student participation
- Increased student retention in STEM fields

Cost Related Questions:

- Does it cost more or less than other science courses?
- How much would it cost to replicate this course?

*Today we **do not have the information** to answer these questions.*

New Budget Model: New Incentives

Past: Incremental Budget Design

2012 Budget + **Incremental needs** = **2013 Budget**

Historical Spend

Future: Incentive-Based Budget Model

- *Student Credit Hours*
- *Major*
- *Graduation Rates*

Tuition Revenue to Colleges

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- *Academic Salaries & Benefits*
- *Staff Salaries & Benefits*
- *Research*

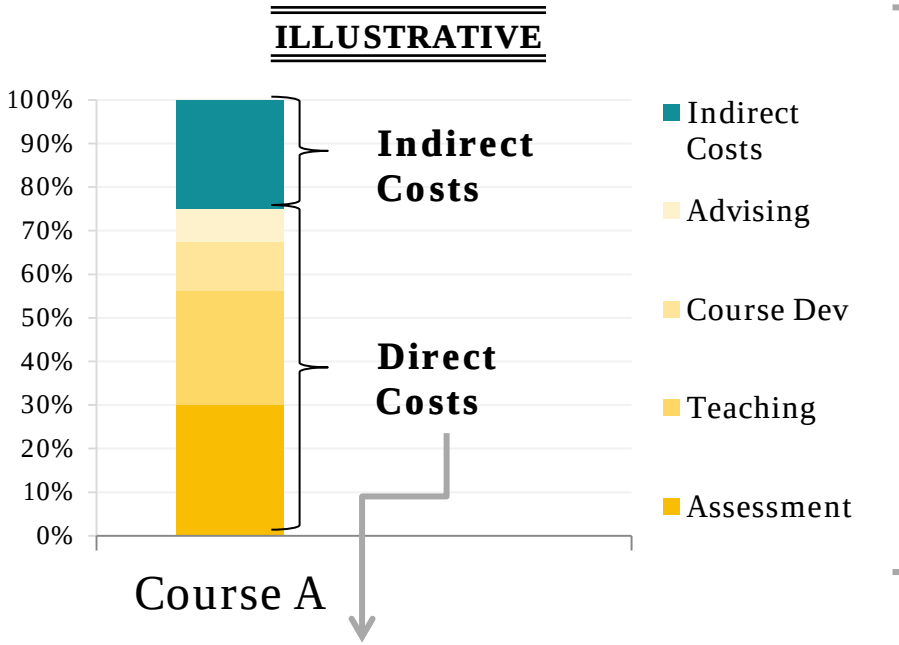
Expense

UCR's new budget model empowers Deans to spend their revenue on their highest priorities.

Proposed methodology combines cost allocation with activity-based costing

Captures both the fully loaded class cost and the cost of discrete educational activities

Sample Course Expense Report



"Fully-loaded" cost data provides a tool for academic and planning administrators to evaluate departmental and program costs and inform decision-making

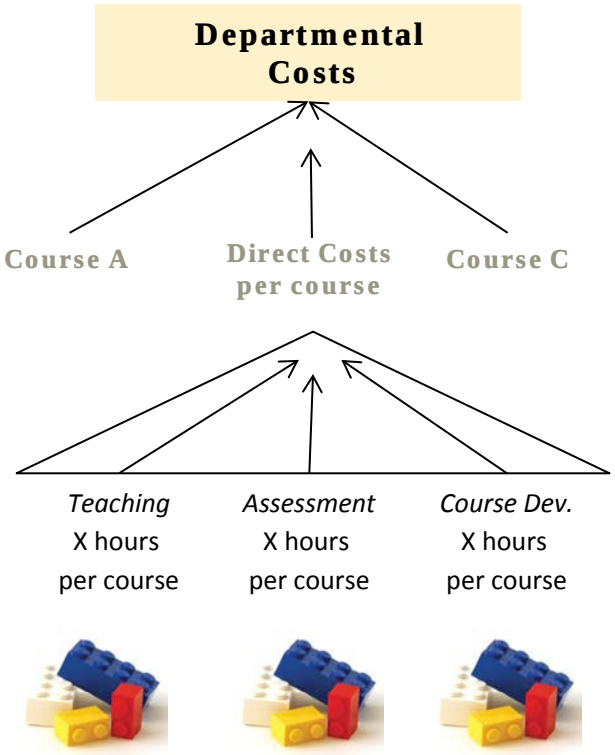
Activity-Based Costing:

Course level activity data allows for innovation and improvement of the educational delivery function

Why is this unique? A paradigm shift

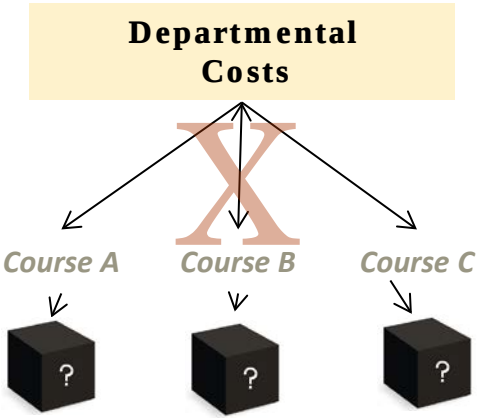
The direct costs should roll-up and not be allocated down for fruitful analysis

Activity-Based Course Costing



Capturing costs from grass-root activities and rolling them up is the only way for institutions to compare the costs of different course delivery design methodologies

Current Education Costing Methodologies



"With cost preceding rather than following activity, departmental production as a function becomes fixed rather than variable and the activity itself is assumed to be beyond analysis"

– Massy, 2003

How will this be done? By understanding our current cost structure

STEP 1:	Create and allocate direct cost categories to courses	**PILOT PHASE**
STEP 2:	Create and allocate indirect cost categories	
STEP 3:	Roll up to majors, departments, college and campus-level	
STEP 4:	Assess academic outcomes	**FUTURE PHASE**

First Step in Direct Cost Allocation: Course Profiles

- In order to allocate costs to the educational activities, course profiles will be created to allocate activity hours and attributes to its courses

Sample Course Profile

Educational Activities

Course Development	Hours
Course Management	Hours
Teaching	Hours
Tutoring	Hours
Advising	Hours
Assessment & Grading	Hours

- Effort on course activities can be captured in "course profiles" – minimizes interviews & effort
- Can be set to differ by school/department, by level/type of course or individual
- Can refine as appropriate over time

Course Attributes

Class Type	Lecture/Lab/etc
Credit Hours	
Delivery Mode	On-campus Online/ Hybrid
Semester	Fall/Summer
# of Students	

- Attributes can be added to course profiles to give more information
- Note that in Excel these would create unmanageable data sets, but DS software can handle this complexity

Benefits of Methodology

Management Tool for Deans and Department Chairs

Improves Resource Allocation Capabilities

- Enable ongoing tool to assess impact of various resource allocation methodologies
- Quantifies the level of cross-subsidization throughout the college allowing explicit evaluation of these decisions

Improves Ability to do Planning & Forecasting

- Ability to run planning scenarios based on different strategic choices
- Informs student enrollment management and programmatic changes

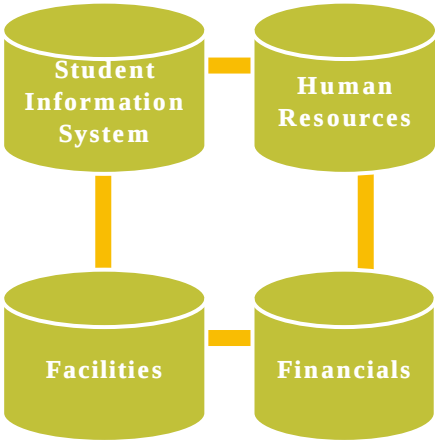
Course Improvement Tool for Our Faculty Members

- Allows analysis and improvement of instructional model
- Illustrates and validates assumptions around course development/delivery
- Provides actionable data regarding the costs to achieve desired educational outcomes

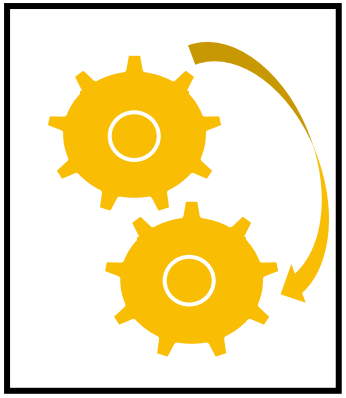
Overall Approach: Technical Design

The technical approach consists of data extraction, transformation and loading. Data definition, categorization and transformation is the key.

Data Extraction



Data Transformation



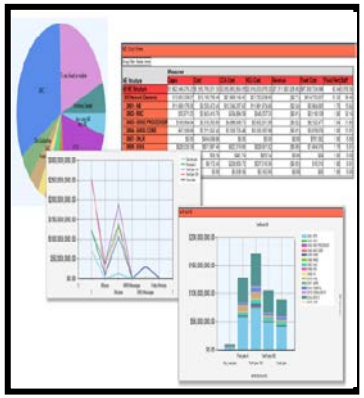
- Sanitize Data
- Define Categories
- Allocate to Categories
- Other Processes

Data Loading

Typical Customer Requirements	Tableau Software	Spotfire
Easy to use - drag-and-drop access	✓	✓
Data Visualization	✓	✓
Data Exploration	✓	✓
In-memory architecture	✓	✓
Connects data from multiple sources	✓	✓
Zero Programming Data Mashups	✓	✓
Self-service Tool	✓	✓
Analytic Dashboards for everyone	✓	✓
Business Users can add their own data – without IT involvement	✓	✓
Publish to the Web	✓	✓
Integrate with Microsoft SharePoint	✓	✓
Supports a Mobile BI strategy	✓	✓
Enterprise-wide Analytics Platform	—	✓
Ability to use 3rd Party Plugins and do custom modifications	⊗	✓
Predictive Analytics	⊗	✓
Expanded Analytics (more than simple Mean, Mode, Stats Functions)	⊗	✓
Advanced Analytics (Box plots, heat maps, tree-maps, data mining ability, etc.)	⊗	✓
Robust Security	⊗	✓
Training and support	⊗	✓
Social Media Integration	⊗	✓
Connect to cube-based data sources	✓	✓

Analytical Cost Engine

Data Analysis



Project Outputs

Technology Deliverables

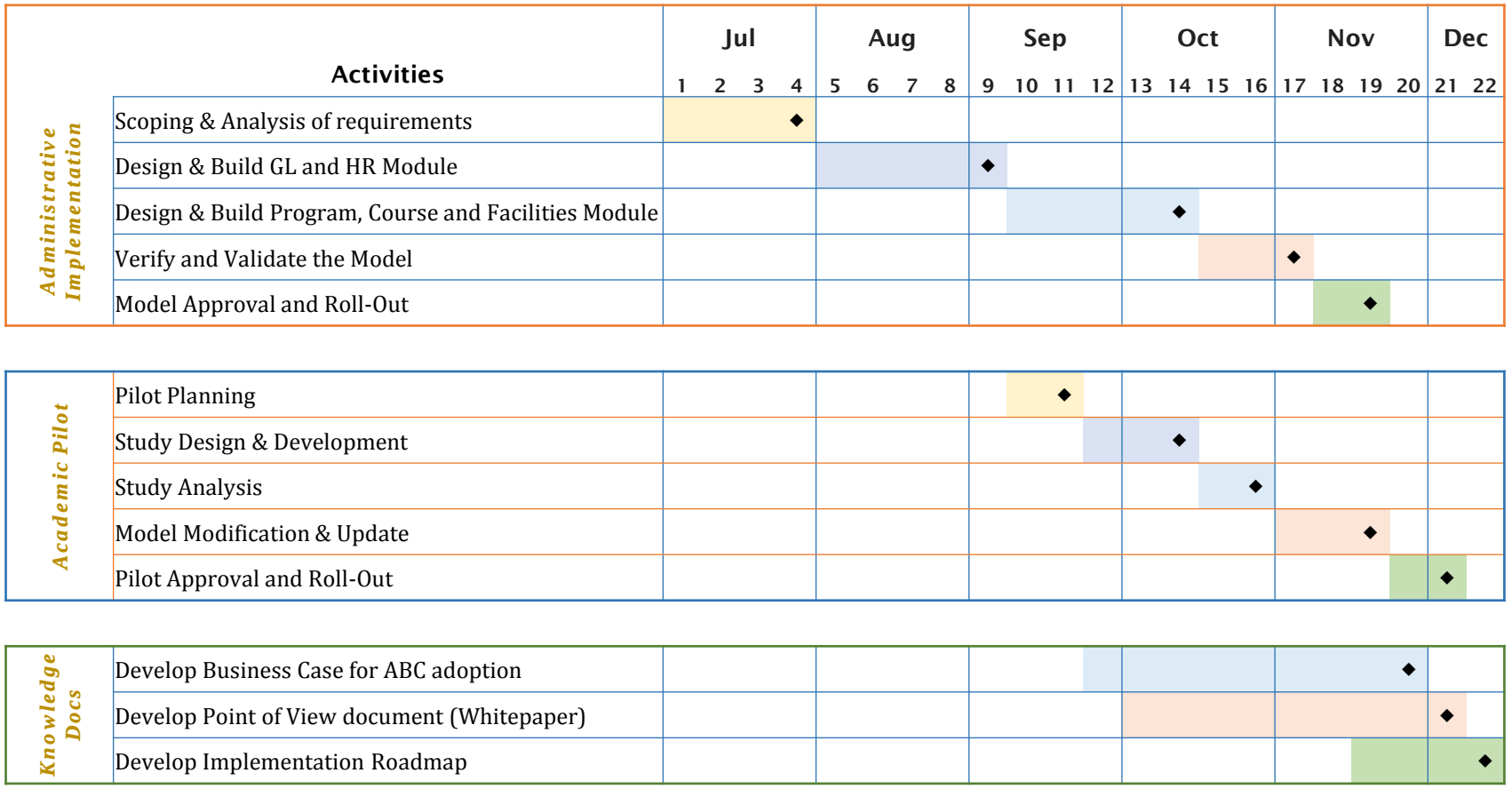
- Reporting cubes reflecting GL and HR data
- Reporting cubes reflecting Programs, Courses and Facilities
- Defined set of Course activities
- Defined set of Course attributes
- Compiled results from academic pilot

Knowledge Dissemination Documentation

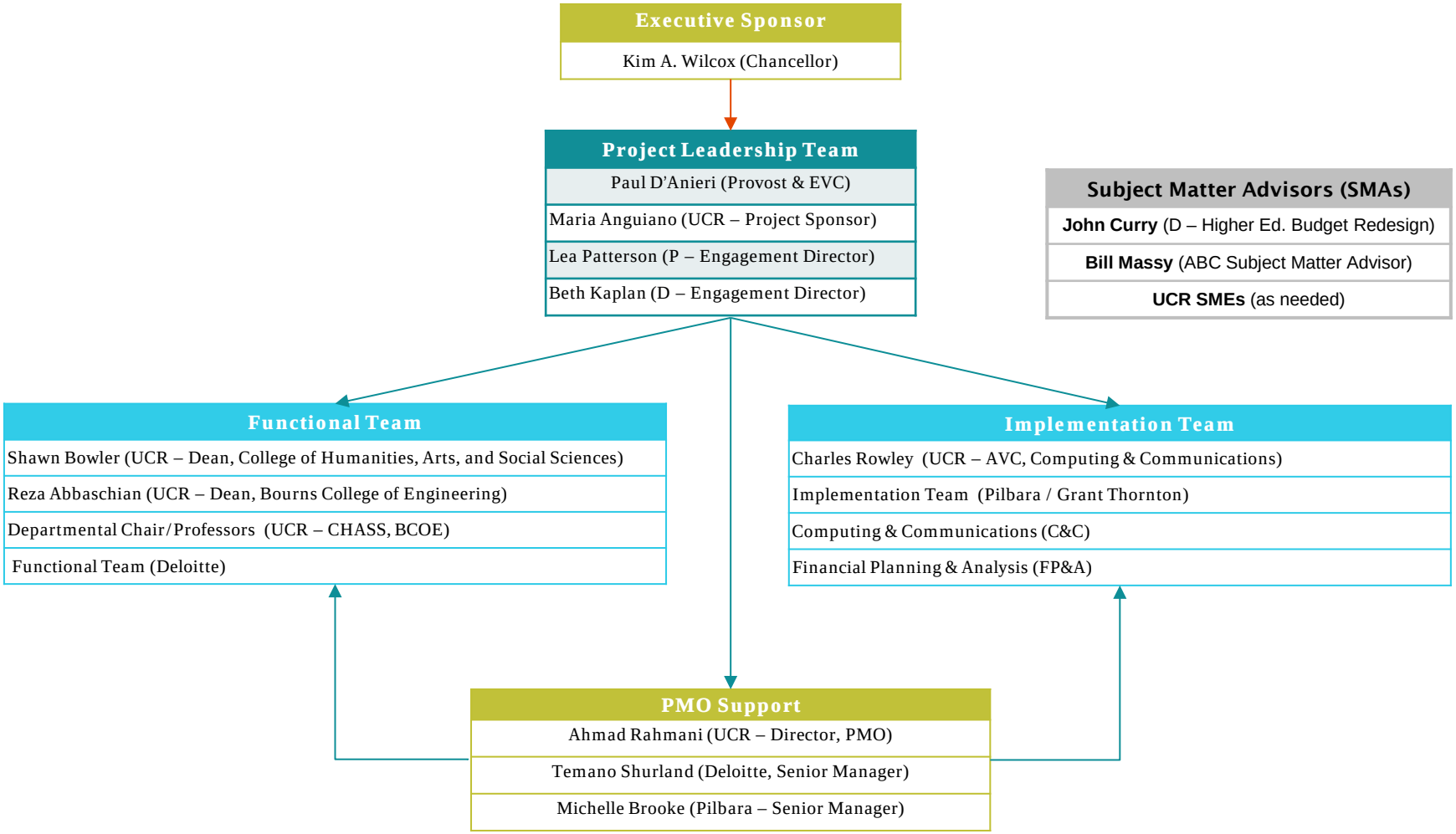
- Executive Summary
- Implementation Guidance
- Tools & Techniques for successful outcomes
- Lessons Learned documentation

Project Timeline

The following is high-level timeline overview of activities envisioned to complete by the end of December, 2015.



Project Team & Structure



Appendix

Cost Structure: What does it mean?

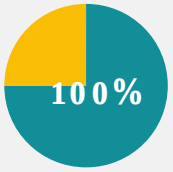
Cost structure deconstructs an institution's total cost of doing business; it is a comprehensive analysis of all the cost elements it takes to ***exist.***

ILLUSTRATIVE

Step 1

Separate out non-educational service lines where applicable

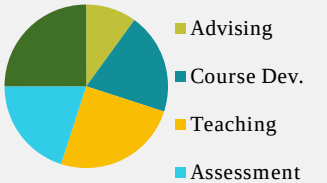
Remaining: Total Ed. Spend



Direct Costs
Indirect Costs

Step 2

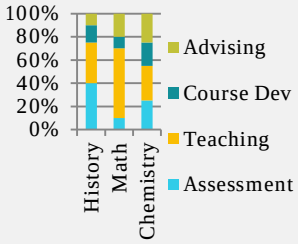
Create Direct Cost Categories



Categorize all direct costs into relevant activities

Step 3

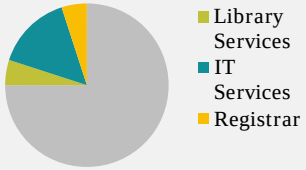
Allocate Direct Costs



Allocate direct costs to programs using cost driver based allocation

Step 4

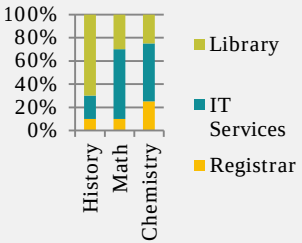
Create Indirect Cost Categories



Categorize all indirect costs into relevant activities

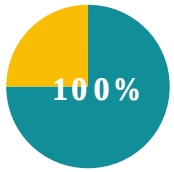
Step 5

Allocate Indirect Costs



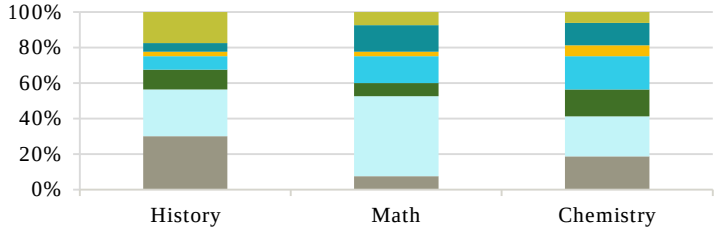
Allocate indirect costs to programs using cost driver based allocation

TOTAL SPEND



Direct Costs
Indirect Costs

NEW TOTAL SPEND



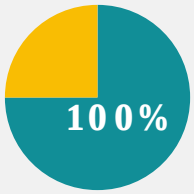
Cost Structure: Step 1

- Many types of higher education institutions can be considered multi-product firms because they produce a variety of things, not just education
- Educational enterprise must be separated from the business-like, self-supporting set of service lines, where costs should be covered by revenues and thus should be irrelevant to the cost per course
  - Examples include: auxiliaries, clinics, technology transfer, and externally funded research

Step 1

Separate out non-educational service lines where applicable

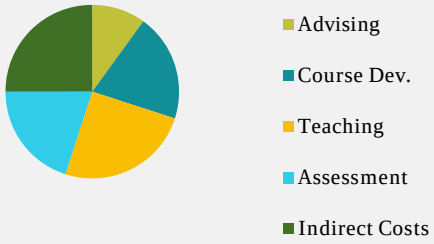
Remaining Total Educational Spend



Cost Structure: Step 2

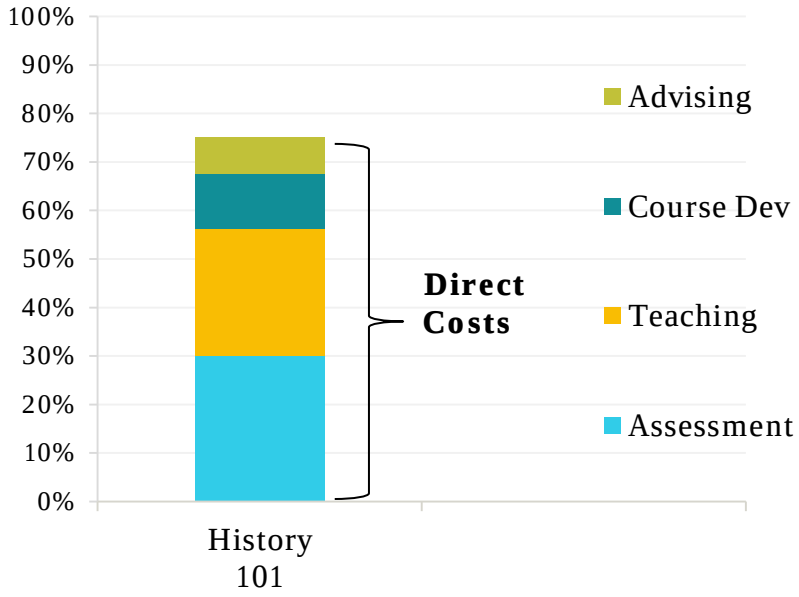
Step 2

Create Direct Cost Categories



Categorize all direct costs into relevant activities

Sample Direct Cost Report



- Institutions have to break down courses by meaningful educational activity categories
- Institutions should use the same educational activities for all course types. Other information can be added in as an attribute using cost allocation software: Type of course, type of instruction (remedial or credit courses), etc.

Direct Cost Activities: In order to create more standardization across the sector, recommendation is for institutions to use buckets created by NHEBI

Institutions should use the same educational activities for all course types. Other information can be added in as an attribute using the cost allocation software (type of course, type of instruction (remedial or credit courses) or even student type).

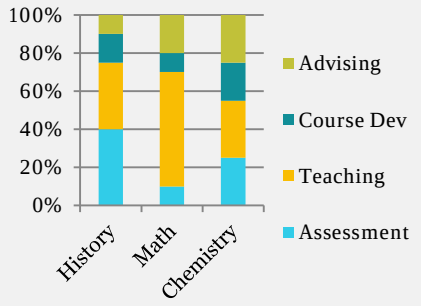
	Direct Activities*	Description*
1	Course Development	Creating and planning curriculum, pedagogy, instruction, and delivery methods to guide student learning.
2	Course Management	Planning learning activities, selecting and creating course content and materials, engaging in course organization.
3	Teaching	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.

**Direct course activities and their descriptions from National Higher Education Benchmarking Institute (NHEBI)*

Cost Structure: Step 3

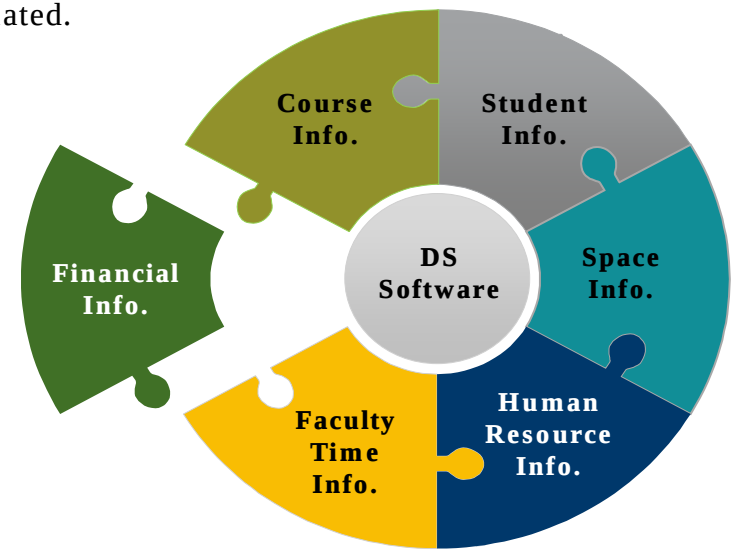
Step 3

Allocate Direct Costs



Allocate direct costs to programs using cost driver based allocation

- The task required is NOT the allocation of total departmental costs to each activity, but rather to start with estimates on the time it takes to complete any given activity
- Cost allocation calculation requires a wide variety of information, **financial information is just one piece of the puzzle**
- Complex task, but decision support software and use of a variety of non-financial data from institution allows cost allocation to be more practical than in the past and for it to be fairly automated.
- Good data is **KEY**



Understanding the Information Puzzle

Financial

- Account Information
- (Revenue & Expense)
- Dept./Cost Center
- Fund info.

Course

- Course name & #
- School/Department
- Room (Location)
- # students enrolled

Space & Location

- Building or #
- # of rooms per building
- Room type (e.g. lab)
- Square footage
- Capacity

Payroll/HR

- Employee Type
- Function
- Salary & Fringe
- Home Department

Student Records

- Student Type
- Student number
- Major
- Course enrollment

Faculty Workload

- Type
- Time Estimates
- Salary & Fringe
- Department

First Step in Direct Cost Allocation: Course Profiles

In order to allocate costs to the educational activities, institutions could create course profiles to allocate activity hours and attributes to its courses

- Effort on course activities can be captured in "course profiles" – minimizes interviews & effort
- Can be set to differ by school/department, by level/type of course or individual
- Can refine as appropriate over time

- Attributes can be added to course profiles to give more information
- Note that in Excel these would create unmanageable data sets, but Decision Support software can handle this complexity

Sample Course Profile

Educational Activities	Course Development	Hours
	Course Management	Hours
	Teaching	Hours
	Tutoring	Hours
	Advising	Hours
	Assessment & Grading	Hours
Course Attributes	Class Type	Lecture/Lab/etc
	Credit Hours	
	Delivery Mode	On-campus Online/ Hybrid
	Semester	Fall/Summer
	# of Students	

Second Step – Combine with Financial Data

Once educational activities & hours for each are identified: Costs per hour can be allocated. Can calculate by course and roll up by school/department

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 1

School of Liberal Arts

School of Medicine

School of Engineering

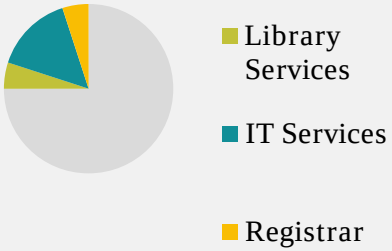
Activity hours are combined with HR/financial data to calculate per course expenses

Non-financial information can be included to create specific metrics

Cost Structure: Step 4

Step 4

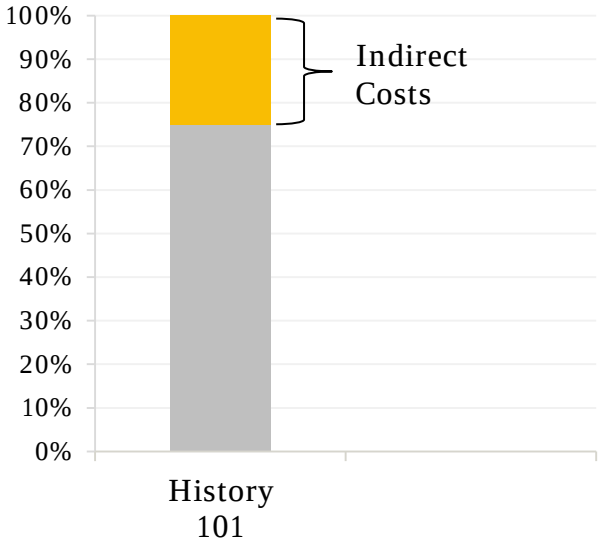
Create Indirect Cost Categories



Categorize all indirect costs into relevant activities

Sample Course Expense Report

ILLUSTRATIVE



- Only direct costs are needed for course redesign work
- However, from an institution-wide perspective, all costs should be allocated to calculate the **fully loaded cost** of providing students with instruction

- Indirect costs should not be distributed evenly across courses, assuming they are evenly distributed among all courses
- Different costs have different cost drivers and any cost allocation methodology must acknowledge these differences.

Indirect Cost Categories & Activities

*These categories allow the institution to **group high level categories of expenses** as well as the **flexibility to analyze** the specific activities within each category type*

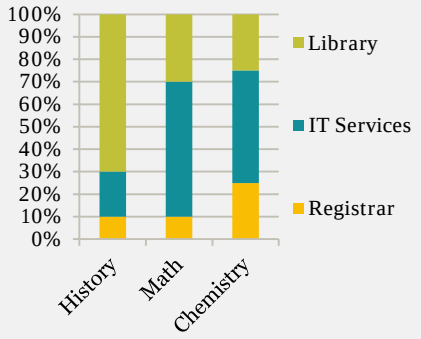
Type of Expense	Activity	Type of Expense	Activity
College or Departmental Overhead	Academic Administration	**Student Services***	Admissions (includes marketing/recruiting)
	Other Administration		Advising
	Facilities & Space		Tutoring
	Other Expenses		Counseling
Academic Overhead/ Academic Support	Academic 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		

**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*

Cost Structure: Step 5

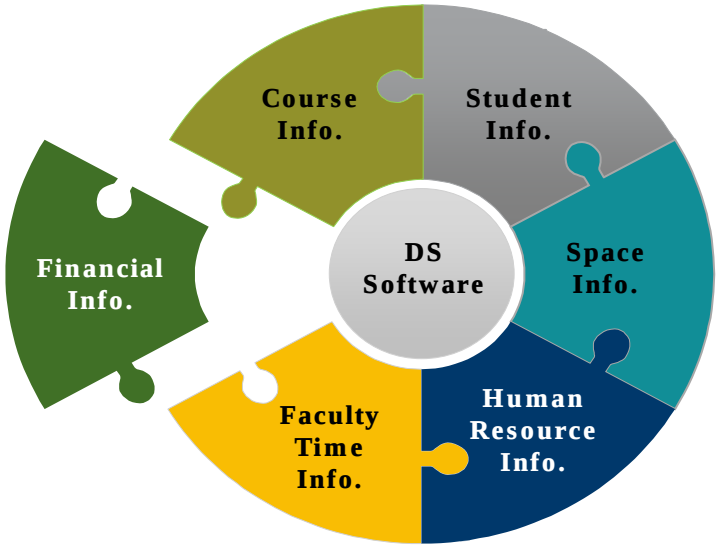
Step 5

Allocate Indirect Costs



Allocate indirect costs to programs using cost driver based allocation

- Indirect cost allocation calculation also requires a wide variety of non-financial information
- Each category and activity should be analyzed separately and assigned appropriate cost drivers
- Like direct costs, cost allocation can be a complex task, but decision support software and use of a variety of non financial data from institution allows cost allocation to be done fairly easily and automatically



Key is Identifying Appropriate Cost Drivers

Indirect cost categories are further broken down into relevant activities and cost drivers are assigned to each

Sample Indirect Cost Categories

Type of Expense	Activity	Cost Driver/Allocation Methodology
College or Departmental Overhead	Facilities & Space	Square Footage Utilized
Academic Overhead/ Academic Support	Library Services	# of Faculty + # of students
Institutional Overhead	Administration (HR/IT/Finance)	# of FT Employees
Student Services	Admissions (e.g. marketing/recruiting)	# of FT Students
	Advising	# of FT Students
	Counseling	# of FT Students
	Career Services	# of FT Students

Cost allocation for indirect costs will be based on relevant cost drivers

Cost drivers will be defined in cost allocation software and will pull from both financial and non-financial databases

Final Product: Fully Loaded Cost per Course Information

Sample Course Cost

School of Business Course 1	Hours	% Total	Expense
Direct Costs			
Course Development	Hours	10%	$$
Course Management	Hours	20%	$$
Teaching	Hours	40%	$$
Tutoring	Hours	20%	$$
Advising	Hours	10%	$$
Assessment & Grading	Hours	10%	$$
Total			$$
Indirect Costs			
Departmental Overhead			$$
Academic Support			$$
Institutional Overhead			$$
Student Services			
Total			$$

Steps 2 & 3
Calculate direct cost of instruction

Steps 4 & 5 Allocate indirect costs to courses for a fully loaded cost