Johnson County Community College
College Cost Management Model

Gates Foundation Grant –Whitepaper Addendum
October 2016

In August 2015, Johnson County Community College (JCCC) and the University of California – Riverside (UCR) received a grant from the Bill and Melinda Gates Foundation (Gates Foundation) to develop and implement management tools designed to help maximize resources to deliver quality educational outcomes to their students. With support from the grant, both schools developed and implemented activity-based cost (ABC) management models to better understand how the financial resources of the institution are allocated to the activities that support the mission of each respective institution.

This whitepaper serves as a final deliverable to the Gates Foundation – it documents the experience of designing and implementing the model at JCCC. The whitepaper is intended to be a supplement to the UCR whitepaper – and is thus designed to compare and contrast the model development and implementation experiences at JCCC with those detailed in the UCR whitepaper. As a pilot project, lessons learned by JCCC may also benefit other community colleges in understanding the process undertaken to create and implement a cost management model.

ACTIVITY-BASED COST MODELING AT JCCC – AN INTRODUCTION
About JCCC
Located in Overland Park, Kansas, JCCC is one of the state's largest higher education institutions. Known for excellence in programming and teaching, JCCC offers a full range of undergraduate credit courses and 150 career and certificate programs that prepare students for employment. JCCC's noncredit workforce development program is the largest, most comprehensive in the Kansas City area.

JCCC is funded through a combination of ad valorem property tax, tuition & fees, state grants and other income. The 2016-17 General Fund revenue budget[1] is:

- Ad Valorem Taxes: $87,460,211 (61%)
- Tuition and Fees: $31,107,337 (22%)
- State Grant: $20,854,451 (15%)
- Other Income: $2,499,326 (2%)

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[1] JCCC 2016-17 Revenue Budget: http://www.jccc.edu/about/leadership-governance/reports/files/budget/management-budget-2016-2017.pdf

JCCC's mission is to inspire learning to transform lives and strengthen communities. In order to support the Johnson County community, the school has laid out an ambitious strategy to meet its mission:

- Innovative, high-quality curriculum
- Preparation for college/university transfer
- Occupational preparation and retraining
- High enrollments and accreditation
- A diverse student body
- Dedicated faculty and staff
- A beautiful, well-maintained campus
- Supportive student services
- Programs for special student groups

- Collaborative programs with other schools
- International education
- Lifelong education and workforce training
- Social/cultural/recreational enrichment
- Affordable costs
- Easy enrollment
- Athletics on campus
- Promoting economic development and partnerships[2]

To meet its mission, JCCC serves a wide and varied student body – serving the needs of the entire Johnson County community. Fall 2015 credit enrollment student headcount was 19,091 (32% full time; 68% part time). 77% of the student body resides in Johnson County, with 16% being from other Kansas counties, and the remaining 7% from out of state. To meet the educational needs of the entire community (most notably because not every student can take courses taught in the conventional classroom), JCCC also offers online classes, self-paced study, courses taught by arrangement, weekend classes, classes at local high schools, late-start classes, accelerated classes and credit through prior learning assessment. Supporting this student body presents unique management challenges, two of which were significant to the College's cost management model development and implementation process:

1) how to evaluate and manage performance between "traditional" for-credit academic learning and non-credit, certificate based, training; and
2) understanding the implications (particularly to facilities management) of increased online enrollment.

Further in support of its mission, the school is currently engaged in a 3-year strategic plan. Goal 4 of this plan is to *commit to the efficient use of resources to strengthen quality of offerings.[3]* This goal consists of 3 tasks:

1) reduce administrative costs as a percentage of total expenditures through streamlining business processes, service area reviews and reallocation of resources from administrative functions toward direct student success activities;
2) improve facility utilization; and

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[2] Fulfilling JCCC's Mission: http://www.jccc.edu/about/story/mission/fulfilling-mission.html
[3] Strategic Planning at JCCC: http://www.jccc.edu/about/leadership- governance/ administration/ president/ strategic-planning/ goals.html

3) revamp the budget process to align with the strategic goals.

In addition, the College's strategic plan focused on fully implementing academic program review to ensure curricular offerings maintain high quality and align with community needs. One element of the former program review cycle involved cost data through traditional expenditure reports of direct academic departmental costs. Implementing a cost management model using ABC principles provides a different lens through which decision-makers can identify opportunities to evaluate costs and revenues to achieve the goals set forth in the strategic plan.

JCCC Model Goals

The goal of the Gates Foundation higher education cost management pilot project is to better understand instructional resources and to build a model to share with other universities, community colleges and educational institutions by implementing an Academic Cost Structure and Performance Management system.[4] JCCC participated in the pilot project because the institution was interested in leveraging new and improved data to inform advanced management analytics and decision-making. The model was developed to provide insight into the margin and performance of the institution not previously available. With an accurate understanding of the activities and cost base which make up operations, management can adjust and manage those operations with a fuller understanding of how various aspects of the institution's operations impact margin and performance.   Adding revenue to the model allows cost dimensions to be compared to the amount of funding received, providing for a comprehensive analysis of margins.

The model was also developed in such a way to provide a basis for analyzing class sizes and durations, and determining capacity utilization of current buildings and their impact on the margin and performance of the institution. Understanding the institution's cost base, margin and performance through a college cost management model puts JCCC in a strong position to conduct "what if" analysis and predictive modeling. A select list of management information JCCC leadership was interested to see as model output included:

"To summarize, and this is an essential point, the goal of ABC is not simply to reduce costs, which we already know how to do. Rather, acknowledging that all of our decisions are made under cost constraint, the goal is to have information about costs that allows us to maximize the quality we get for any level of spending."
Massy, 2016

- **Program margin**: The allocation of overhead costs to particular departments and programs, giving more precise information as to the relative operating margins for programs at JCCC.
- **Facility utilization**: To meet community demand, JCCC has greatly expanded the amount of online courses offered, with nearly 20% of its credit offerings now delivered online. Because the management model captures facility, activity and timetabling data, it provides information to help understand how classrooms and other building space is utilized across the campus.
- **Normalize credit and continuing education courses**: As a community college serving all educational needs of the community, JCCC has a strong continuing education certificate-based

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[4] Gates Foundation How We Work Grants Database: http://www.gatesfoundation.org/How-We-Work/Quick-Links/Grants-Database/Grants/2015/08/OPP1135647

program. Because the continuing education program is managed (and "success" is defined) differently from "traditional" for-credit teaching, it is challenging to evaluate and assign overhead consistently to these two parts of the college. The model is designed to normalize this data through activities, and assign overhead cost across the entire institution.

- **Support existing reporting**: As a management thought leader among community colleges, JCCC participates in a number of initiatives (including the National Community College Cost & Productivity Project (NCCCPP) and National Higher Education Benchmarking Institute) designed to analyze and implement best practices. The model is designed in such a way to capture data that can be reported to these institutions.

- **Support the new Administrative and Service area review process:** The allocation of overhead costs provides more information as to the relative operating margins for administrative and services area reviews.

As more schools implement and adopt these cost management models, JCCC also seeks to leverage data from similar institutions to perform benchmarking analysis and develop and share best practices.

MAKING ABC A SUCCESSFUL DECISION MAKING TOOL FOR JCCC MANAGEMENT
Setting ABC Management Modeling Up for Success - Key Considerations at JCCC
As described above, designing and implementing a cost management model is a complex task. Many considerations need to be made by all relevant stakeholders before the project is initiated to help ensure the model is properly constructed, and the subsequent reporting capabilities meet the needs of institution management. In addition to the considerations above, JCCC identified several other items that helped to prepare for and implement a successful cost management model (or, conversely, things they "wished they knew" when they started). Key specific considerations at JCCC included:

1) **Define model goals**: There is not a "one-size-fits-all" solution to developing a cost model. Rather, it is a model designed to uncover activity-based data that was not previously available. Thus, it is paramount to understand what information an institution wants to get out of the model, so that the model is designed and implemented in such a way that it supports the reporting outputs needed to make key management decisions.

> ### Key Value #1:
> ### The Ethic of Efficiency
>
> When public universities are so short of funding, there is an ethical imperative to ensure that every dollar spent is allocated in such a way as to best serve their institutional missions. Harry Brighouse at the University of Wisconsin has termed this imperative the **"ethic of efficiency"**. Rather than characterizing efficiency as something that undermines a university's values and mission, the ethic of efficiency maintains that if leadership is able to free up even one dollar to invest in a high priority mission, there is an ethical obligation to do so.

2) **Academic leadership is key:** At any higher education institution, teaching is a critical activity in delivering the school's mission, and academics serve as key actors in that activity. Further, academics have key insights into how courses are delivered, which is fundamental to a successful model build. Thus, it is important to involve and receive regular input from the academic community in the model's development.

3) **Normalization of data**: A feature of an ABC model implementation is that it takes data from across the enterprise and normalizes it. Often, particular data sets at a school are managed in "silos" (that is, they are developed and used for one purpose, and thus never directly linked or compared to other data sets at the school). Inconsistencies can arise in how similar data points are managed in different data sets. The cost management model development process forces data sets to be compared and directly linked to one another. An ancillary benefit of the JCCC implementation is that it gives insight into these inconsistencies, and enabled the school to better standardize its data dictionary.

> **Key Value #2:**
> **Making Informed Decisions**
>
> Academic leaders must continually assess their available and finite resources in order to somehow determine the most effective combination of courses and class sizes. Ultimately, the greater question is not what courses to teach or who should instruct, but rather whether the academic leaders have the necessary data to adequately consider the optimization of limited resources.

4) **Address concerns**: At the outset of a cost management model project, it is important to discuss what the model is, and what it is not. Key to stakeholder buy-in at JCCC is to articulate that the model is designed to better understand costs and program margins. It is equally important to emphasize that the model is not a cost cutting tool – the intent is not to identify activities/classes/etc. that are "expensive"– a high-cost program may be operating efficiently, be meeting community needs, and have strong student outcomes– indicating the school should replicate those activities and behaviors.

UNDERSTANDING AND USING ABC MANAGEMENT MODEL DATA AT JCCC
What Information Can an ABC Management Model Provide?

In order to precisely and accurately allocate costs to activities, products and services across the institution, the JCCC cost management model was designed to drill down to the cost of individual courses in each department. Thus, the model effectively stores all information at a per-course level. Each course entry contains a number of data fields that include the course's calculated revenue, expense, and margin, as well as information regarding type of class, class size, delivery mode, type of student enrolled, credit hours, etc.

By having the entire cost structure of the college allocated down to a course-by-course level (or the equivalent non-teaching output), there is significant ability to aggregate the data through different lenses—such as department, division, course level, course delivery type, etc. In this structure, revenue and expenses are captured on an individual course section level, but can be aggregated up to all offerings of that course, total courses in the department, total courses in the division, total cost within the College, and total teaching cost for the College. The model also includes non-teaching outputs like public service (e.g., the College's Nerman Museum of Contemporary Art or its Carlsen Performing Arts Center) and auxiliary and self-supporting outputs (e.g. dining, vending, bookstore, cafes, etc.)

How Model Data is used at JCCC

A key driver to motivate higher education institutions to develop and implement a cost management model is to uncover insight into the margin and performance of the institution not previously available. Because the data is stored at the per-course level, with ability to aggregate to different levels, JCCC is able to define and design a number of reports to support management decisions. In the short time JCCC management has used the model, they have already identified data that provides better insight into how activities are consuming financial resources – identifying activities and outcomes that require more insight and analysis, helping to drive more informed management decisions (it is important to note that these are immediate uses, and that JCCC is considering numerous other analyses as the model and its management becomes more mature). Some examples include:

- **New insights into program margin**: Previously, class-level margin analysis at JCCC consisted of analyzing the direct tuition revenue and direct costs associated with delivering a particular class. A key feature of an ABC model is that it increases transparency by providing a means to apply overhead costs (in addition to direct costs) to individual courses through the activities that support each course. Applying the overhead costs, and more precisely applying direct costs, greatly increases both the revenue and cost associated with a course – and can also significantly alter the margin between revenue and cost. This uncovers new insights into the operating margin of JCCC courses and programs.

  Figure 1 below illustrates the difference between the College's previous program review model (analyzing revenue, expense and operating margin), compared to analysis using the ABC model. The College formerly applied only direct tuition dollars and formula-based State appropriations to program revenue. A driver within the ABC model directs local ad valorem property taxes to program enrollments for students who reside within Johnson County. At the same time, overhead costs related to support activities (e.g., facilities and maintenance cost, administrative support costs, etc.) are applied to direct program expenses. One can see that this analysis changes the view of program revenues, expenses and program margin, moving this program from one having a significant loss, to one with a positive margin.
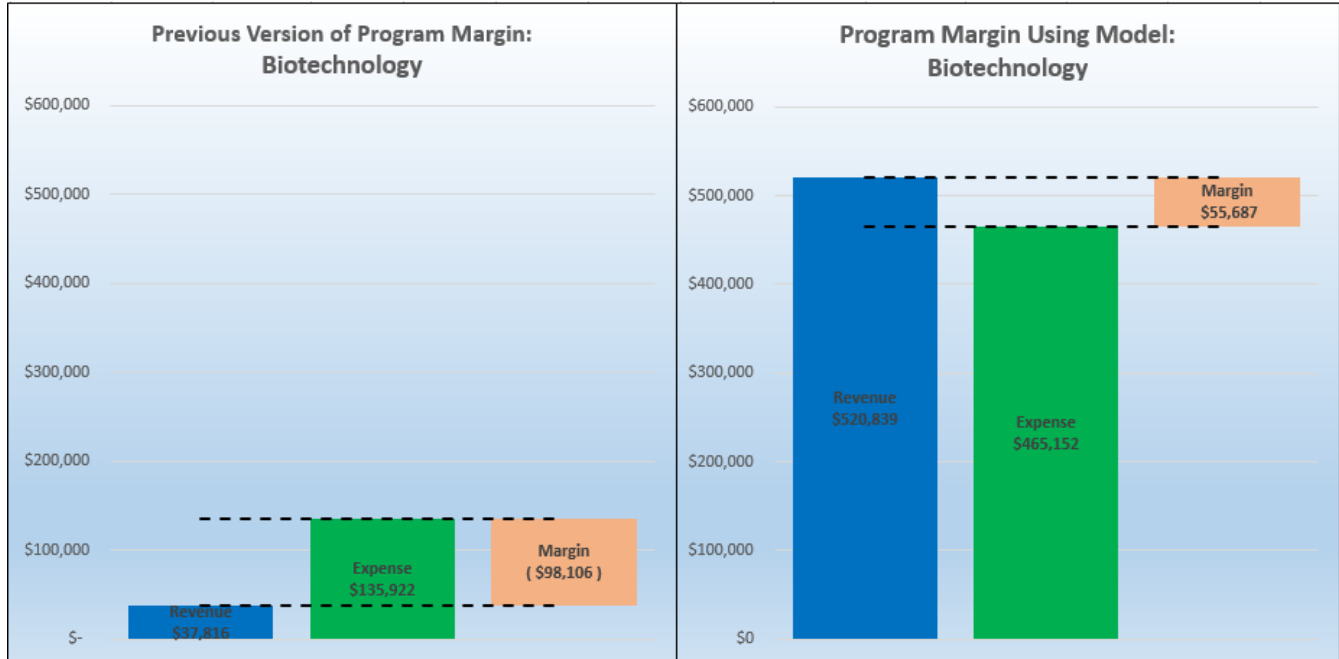
Figure 1. Program-level margin analysis

In addition to the insight for program-level revenue/expense/margin information, the detail built into the cost management model also provides information on other specific measures, including instructional methods and course-level student enrollment and margin information. The first graph in Figure 2 below shows the margin for all courses by each course instruction method (face-to-face, online, hybrid, etc.) within a particular program. The second graph illustrates the relationship between student enrollment and margin for each course offered within a program. In this example, each blue dot is a specific course (metadata on the course can be seen in the reporting software by clicking each dot). The data in the model provides JCCC decision makers with more information related to each course at the College.
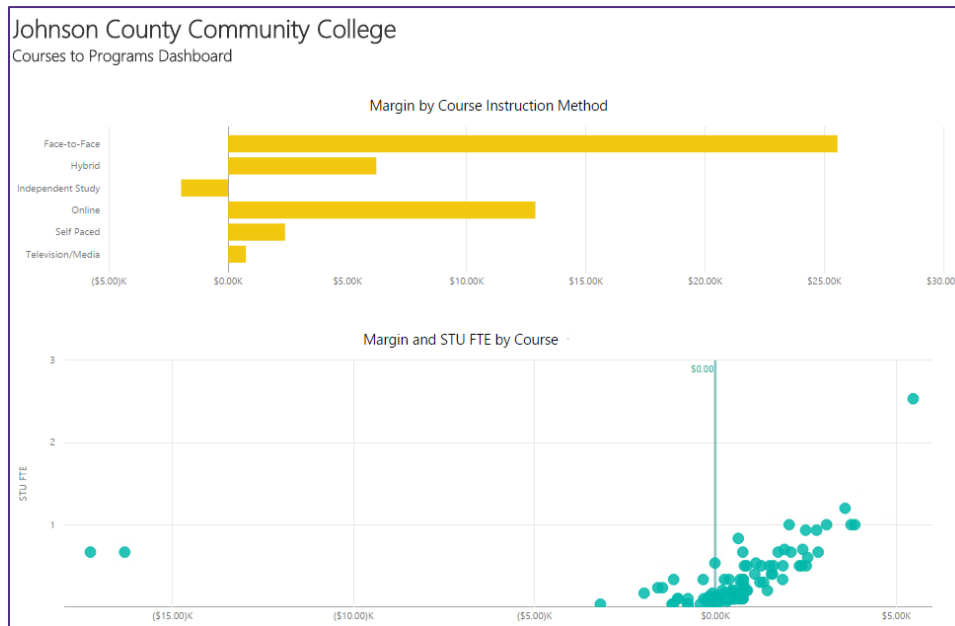

Figure 2. Additional program-level analysis support

- **New insights into facility utilization**: An important management consideration for JCCC is moving from "traditional" face-to-face learning to more online class offerings – meeting the needs of their diverse, community-based student body. JCCC is in the process of developing a facilities master plan, and wants to understand how space is utilized as they move to more online course offerings. At the time of the cost management model implementation, the school had limited facilities data. Combining the needs of a facility master planning exercise and the ABC model, JCCC stakeholders worked to capture facilities data in a way that would support the model and JCCC's future facility planning needs. An end result is a customized Room Utilization report, which helps management analyze room utilization (Figure 3 below).

Johnson County CC Space Utilization

JCCC Building	Academic Department	Room Number and Type	Fall Term Hours	Spring Term Hours	Summer Term Hours	Non Credit Hours	Total Academic Year Hours	% Room Utilization
CC	4637 : Dean, Academic Support	229 : Classroom-Learning Studio	397	578	80		1,055	53%
CLB	1111 : Mathematics	213 : Lab-Math	712	842	392		1,947	97%
CLB	1111 : Mathematics	403 : Classroom	487	534	208		1,229	61%
CLB	1131 : Organismal Biology	407 : Lab-Science	722	764			1,486	74%
CLB	1219 : Nursing	111 : Lab-Health	92	148	132		372	19%
CLB	1219 : Nursing	113 : Lab-Health	141	26			167	8%
GEB	1111 : Mathematics	340 : Classroom	459	516	248		1,223	61%
ITC	1212 : Electronics Technology	184 : Lab-Electronics	314	395			709	35%
LIB	1104 : English	359 : Lab-Computer	521	448	80	17	1,066	53%
OCB	1109 : Music	192 : Music Studio	296	299	13	90	698	35%
OCB	1109 : Music	364 : Music Studio	604	659	111	96	1,470	74%
OHEC	1243 : Practical Nursing/Health Occup	207 : Sim Lab-Nursing		152			152	8%
OHEC	4635 : Community Outreach - Credit Inst	107 : Classroom	674	720	91		1,484	74%
PA	1216 : Police Academy	125 : Classroom	833	1,190		90	2,113	106%
RC	1207 : Information Systems	344 : Lab-Computer	453	552	45		1,050	53%
RC	1416 : Continuing Education	144 : Seminar Room		3		386	389	19%
RC	1416 : Continuing Education	221 : Lab-Computer	221	82		78	381	19%
SCI	1122 : Psychology	212 : Classroom	612	600			1,212	61%
SCI	1127 : Human Sciences	111 : Lab-Biology	694	872	221		1,787	89%
SCI	1128 : Biology	207 : Lab-Biology	242	352	102		696	35%
WLB	1277 : Railroad Industrial Technology	156 : Thermite Lab		270	117		387	19%

Figure 3. New insights into facility utilization

- **Ability to compare course delivery methods**: The cost management model uncovered new insights into the margin of offering a course "face-to-face" versus online. In Figure 4 below, the revenue and gross margin for face-to-face for Accounting I is higher than online (driven by more students), but the percent margin is greater for Accounting I online (driven by very low expense due to no facility costs associated with online classes). Further, applying a per-student full-time equivalent (FTE) revenue, cost and margin amount gives insight into the relative cost of delivery type. Combining this information with the facility utilization information (above) will enable JCCC to make informed decisions about the impact of transitioning to online delivery.
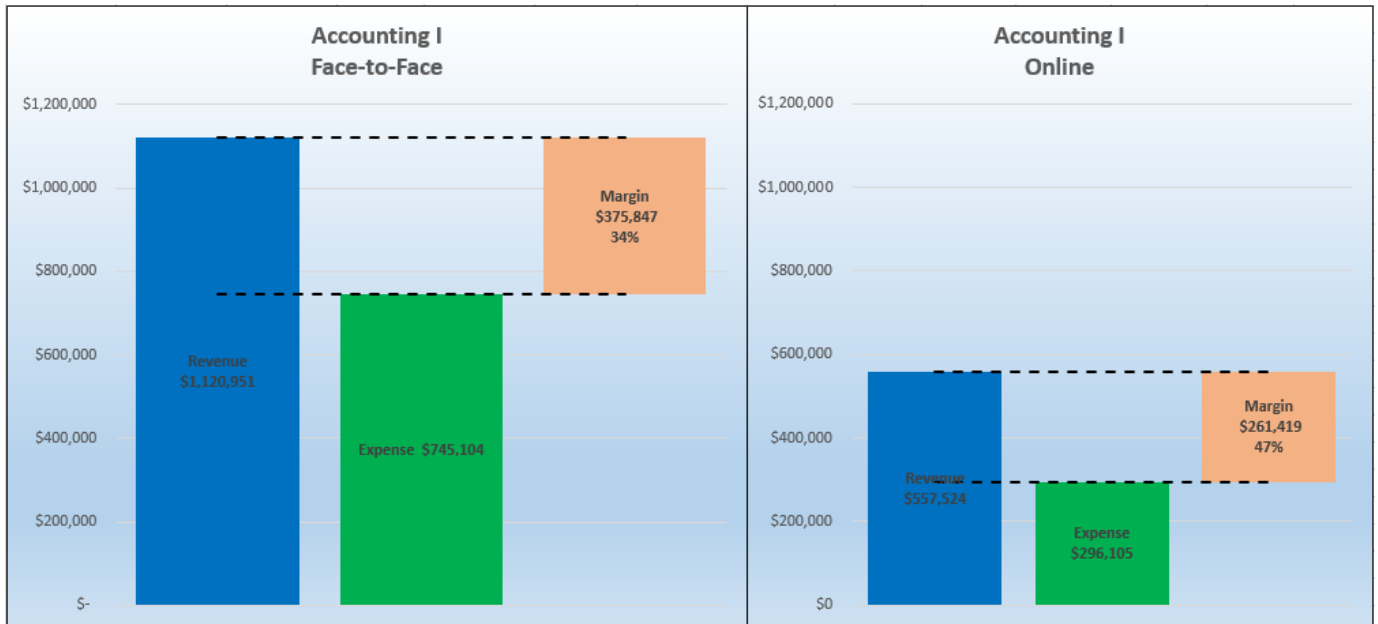
Figure 4. Comparison of course delivery methods

- **Support existing reports**: As a cost and performance management thought leader, JCCC participates in a number of projects (including the Benchmarking Institute and NCCCPP) that collect college-level cost and performance data. The cost management model is designed in such a way to incorporate data elements that provide reporting information that can be submitted in support of these projects. For instance, inclusion of key attributes such as the Classification of Instructional Programs (CIP) makes it possible to calculate and report data by CIP, thereby supporting existing reporting requirements. Figure 5 below provides JCCC with data information on academic resources for the Fall 2014 semester (expressed in terms of annual FTE) by CIP code. This data can used by JCCC for NCCCPP reporting.

Course CIP	Department Direct (Credit)					
	Total Direct Academic	Full-Time Academic	Full-Time Staff	Other Academic	Part-Time Academic	
	ACAD FTE TOTAL	ACAD FTE	ACAD FTE	ACAD FTE	ACAD FTE	STAFF FTE
All Course CIP	233.66	142.40	2.87	0.04	81.82	6.53
09.0101 : Speech Communication and Rhetoric.	8.33	3.05	0.00	0.00	5.28	0.00
12.0504 : Restaurant, Culinary, and Catering Management/Manager.	7.57	6.52	0.00	0.00	1.05	0.00
23.0101 : English Language and Literature, General.	20.68	11.83	0.00	0.00	8.54	0.31
24.0103 : Humanities/Humanistic Studies.	7.20	3.78	0.00	0.00	3.35	0.07
26.0101 : Biology/Biological Sciences, General.	10.81	7.78	0.07	0.00	2.91	0.05
27.0101 : Mathematics, General.	13.24	8.86	0.00	0.00	3.86	0.52
32.0104 : Developmental/Remedial Mathematics	8.89	5.95	0.00	0.00	2.59	0.35
32.0108 : Developmental/Remedial English.	4.21	3.86	0.00	0.00	0.35	0.00
40.0501 : Chemistry, General.	7.28	5.24	0.05	0.00	1.96	0.03
42.0101 : Psychology, General.	6.09	3.17	0.00	0.00	2.66	0.26
45.1101 : Sociology.	5.51	3.16	0.00	0.00	2.35	0.00
51.0602 : Dental Hygiene/Hygienist.	3.69	3.04	0.00	0.00	0.65	0.00
51.3801 : Registered Nursing/Registered Nurse.	9.57	8.55	0.00	0.00	1.02	0.00

Figure 5. Existing CIP reporting support

- **Understand impact of different allocation scenarios for ad-valorem tax revenue:** JCCC receives approximately $87 million in annual property tax revenue from Johnson County. In the College's prior program review cost and revenue analysis, only direct course tuition and formula-based state of Kansas appropriations were allocated to credit courses. As the ABC model was developed, it was determined that most ad-valorem tax revenue would be driven to credit classes based on Johnson County resident student enrollment, as it was assumed that the community benefits from the availability and administration of these courses. However, JCCC management is interested in understanding the implications of distributing some of this local property tax revenue to other College outputs that are assumed to benefit the community – including community service and continuing education expenses in the JCCC general fund.   To address this need, JCCC developed different report scenarios in which different proportions of this tax revenue is distributed to different products and services of the College.

MODEL IMPLEMENTATION AT JCCC

The JCCC cost management model pilot project commenced in December 2015. The initial design and implementation project consisted on the following phases:
1) Vendor selection and cost management model setup
2) Cost model development
3) *Data validation (ongoing)*
4) *Cost Management Model data/report roll-out and adoption across campus (ongoing)*

JCCC is currently engaged in the data validation and roll-out and adoption phases – reviewing the cost model outputs to ensure they meet management needs, and sharing the analysis and benefits across the campus. JCCC's cost management model implementation pilot required broad engagement of campus stakeholders, as well as collaborative partnerships with numerous external entities – most notably the Gates Foundation, Grant Thornton LLP and the Pilbara Group.

This section provides an understanding of the level of effort needed to develop and implement a higher education cost management model, defines the model development process at JCCC and UCR, and discusses observations from JCCC's project experience.

Level of Effort

The table below summarizes the timeline and costs (software, external consulting costs and internal staff time) for each phase of the project. It is important to note in defining level of effort that each school is different, and there are key drivers that determine the size, scope and complexity of an ABC higher education management model. The most significant drivers that impact level of effort are school size, complexity of the data sets, and the degree to which the different data sets are comparable to each other. The assessment conducted during the Scoping Study (described below) will give a more precise understanding of the LOE required to conduct implementation activities at a particular campus.

JCCC Implementation Summary				
	Phase I **Vendor Selection** **and Model Setup**	**Phase II** **Strategic Cost** **Allocation**	**Phase III** **Data Validation** **and Analysis**	**Phase IV** **Data/Report Socialization** **and Adoption**
Timeline	3 months	3 months	6 months	1 year *(est. next 12 months)*
Software Cost (per 12 month license)[5]:	$24,000			
External Consultants for Model Implementation:	$272,000			Annual Update $50,000
External Consultants for Faculty Survey:		$35,000		
Internal Staff:	$75,000 or 1.5 FTE for 6 months		$50,000 or 1 FTE for 6 months	$100,000 for 1.0 FTE for 1 year

Table 1. Level of effort estimate

JCCC Model Development Process

Grant Thornton LLP and the Pilbara Group were retained by both JCCC and UCR to develop the cost management model at each campus. In the spirit of the overall grant from the Gates Foundation, the implementation teams worked in close coordination to ensure models were designed using a similar construct, and thus were comparable. Fundamentally, the implementation focused on the five same key milestones: 1) conduct scoping study, 2) create GL and human resources (HR) modules, 3) create program, course and facilities modules, 4) present balanced and reconcilable first pass model, and 5) present balanced and reconcilable second pass (final) model. These 5 milestones are described below:

Figure 6. ABC model development process

1) **Scoping study**: The integration of new technologies into existing operations is a complex task, especially since this usually involves integrating isolated systems running independently of one another. The scoping study milestone is designed to assess the range of data available and the organizational issues requiring review. The high-level requirements identified during the scoping study were performed in conjunction with the personnel responsible for managing the cost model. At the end of the scoping study, JCCC was provided with a summary analysis and a comprehensive report on the: 1) suitability of the institution's data, 2) data limitations, 3) linkages between source system data, 4) expected outcome refinements, and 5) projected timeframe and cost changes.
2) **GL and HR modules**: This milestone entails loading all GL and HR data into the GL and HR modules of the model. This process includes connecting the identified structure and inter-related data coming from each of the data sources. Connecting the data based on unique fields creates consistency in the way the model treats data and develops a model environment with reliable business rules.

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[5] JCCC acquired a limited version of the ACE software called ACE-lite. This version limits the number of users and does not utilize a standalone server to hold the institution's model(s).

3) **Program, Course and Facilities modules**: This milestone entails loading all remaining data into the model. The objective of milestone three is to create the model's activity module and develop the Program, Course, and Facilities modules by integrating student data, timetable/scheduling data, and facilities/asset data. As with the GL and HR modules, the identified structure and inter-related data originating from each data source requires a defined structure to ensure consistent treatment.

4) **Balanced and reconcilable first pass model**: The goal of this milestone is to finalize all model drivers and assignments to ensure that all revenue and cost used in the model are assigned in the most appropriate way. Additional business rules were determined to account for additional requirements and model calculations were integrated so that all value items flow through the model appropriately.

5) **Balanced and reconcilable second pass (final) model**: This final milestone incorporated further refinements and allocations to the model based on feedback received from the JCCC cost management team. At this point, all reporting cubes were finalized and reports were developed so as to assist JCCC personnel with model analysis and for distribution to key stakeholders. After all model changes were incorporated, a final review of the model was conducted on-site at JCCC. At this point JCCC began to internally review the model to verify no further model refinements were required.

Observations and Challenges – Comparing Implementations at JCCC and UCR

JCCC and UCR serve as good baselines for the Gates Foundation higher education cost management model pilot project because they serve two different academic constituencies, the public 4-year research institution and a 2-year community college. There are key similarities and differences between how these two types of higher education institutions operate. This leads to some defined model activities being the same between the two types (e.g., teaching), while others are different (e.g., research). Because a cost management model maps financial resources to the activities performed in support of the mission of an institution, it is important to note the similarities that can be leveraged by other institutions, as well as the differences - which can be analyzed and evaluated by other institutions seeking to design and implement a successful cost management model. This section identifies observations and challenges identified during the JCCC cost management model pilot project, and, provides discussion as to whether they were similar or different to experiences during the UCR project.

Observations and Challenges – Similarities

A fundamental goal of any higher education institution is to educate students in order to enable them to be productive contributors to society (which can mean many different things to many different people). Thus, there are key fundamentals to developing a higher education cost management model that were found to be similar at JCCC and UCR, and are likely to be similar at most higher education institutions. Key similarities identified during the respective model builds included:

- **Complexity of tracking revenue**: A common challenge in developing higher education cost management models is that expenses are assigned to unique Fund-Organization-Account-Program-Activity-Location (FOAPAL) codes, while a majority of revenue is generally centrally assigned to one or a few codes (e.g., tuition revenue, grant revenue, etc.). It is thus difficult to accurately assign revenue as precisely as cost to the correct structures and objects in the model; a set of assumptions and revenue allocation drivers must be developed to assign revenue in the model. While the need to establish revenue allocation methodologies is something most colleges and universities will have to address, the specific methodologies and business rules

used may vary greatly from institution to institution based on numerous factors. Considerations when establishing revenue allocation methodologies include (but are not limited to): fund sources, institutional objectives, the existence of central reserves for strategic investment funds, and political considerations.

- **Data management**: To the greatest extent possible, it is advisable for individual institutions to use the same data types for higher education cost modeling – doing so will allow institutions to benchmark against each other. Key to this is collecting similar data sets. The JCCC and UCR models leveraged Grant Thornton and Pilbara Group's proven methodology of higher education cost modeling, using the following data sets: GL/financial, asset/space, HR/payroll, timetable and student records. An added bonus is that many institutions leverage similar enterprise resource planning (ERP) software systems to manage their data. Both the UCR and JCCC model implementations used the same types of data and within each type of data the same (or very similar) data sets were used.

- **Faculty surveys**: At both JCCC and UCR, faculty were interviewed to understand and document faculty and course profiles. These profiles are important to distribute the amount of time (and corresponding dollars) a faculty member spends on critical activities in order to fulfill their job requirements. A key observation in both faculty surveys is that there is a wide discrepancy in how faculty reported their time. Because the surveys were conducted with sample professors (and not a full survey of all faculty), there is the high likelihood that the data could be skewed due to outliers. To overcome this, it is recommended that after the model development and before the first update, the Deans for each school or division review the survey results and the impact the results have on how cost is distributed by the model, to confirm the survey results make sense and are distributing costs effectively, and make updates as necessary. This serves as a good check, as Deans have a high-level understanding of how academics spend their time and how they deliver course material across their disciplines – and thus can control for data anomalies from a particular faculty member (who might allocate their time very differently from another faculty member).

- **Consistent methodology**: JCCC and UCR leveraged the same baseline methodology (described above) for developing their cost management models. An advantage to using the same baseline methodology is that efficiencies in development can be identified and implemented (saving time and resources). For example, the source data dictionary developed and used during the UCR model build proved to be extremely useful when sourcing data for the JCCC model. Over time, as more higher education institutions implement cost management models, additional efficiencies can be identified and implemented. It is also important to note, even though each institution uses the same baseline methodology, particular differences found at each institution will require specific model adjustments - meaning that there will always need to be changes from the baseline methodology (there will never be a "one size fits all" solution).

- **Enduring models**: One of the major benefits of implementing the Grant Thornton/Pilbara Group methodology is that it is designed to be easily updated. Business rules and assignments are developed in the model software so that they can be applied year over year, only requiring updated data to be inserted in the model. At the same time, the methodology is designed to be iterative - providing for a "settle-in" period where academics and other stakeholders can review the initial outputs and provide feedback to improve allocations. The feedback is then applied during the next model update (usually conducted annually). Applying a consistent year-over-year methodology allows for trend analysis, as well as any future predictive model implementations.

Observations and Challenges – Differences

While there are numerous similarities in developing a higher education cost management model that are common to most-to-all institutions, there are fundamental differences in how the schools conduct their operations that require different business rules to be applied in developing each model. A key difference identified between JCCC and UCR is that at a community college, research is not a primary activity conducted by faculty, nor a critical output of the school. Thus, there are key differences in how faculty time is assigned to activities based on this workload profile.

During the initiation of this pilot project, key stakeholders had assumed that, because of the lack of a research component, the community college implementation would be less complex. This proved to not be true. The key added level of complexity at JCCC is due to the continuing education (non-credit), certificate component of the school (this level of complexity is likely to exist at most community colleges, given their mission to serve the community). At JCCC, non-credit courses are managed almost completely independently of their for-credit counterparts. While this makes it relatively easy to assign dollars, it created challenges in how to assign activities and drive costs consistent with what is done for "traditional" credit courses. Many of the cost allocation assumptions, assignments and drivers developed at other schools proved not to be valid when modeling non-credit courses at JCCC. The key differences arising from assigning costs to the non-credit courses are outlined below:

- **Faculty time allocation**: At JCCC specifically (not necessarily true for other community colleges), there is little overlap between credit and continuing education faculty. This simplifies the model, because there is not a need to distribute one faculty member's time and pay between the credit and continuing education components. If at another campus (or at JCCC in the future) there is overlap of faculty between the credit and continuing education curriculum, significant complexity would be added to the model by needing to develop a mechanism to distribute time and pay accurately between the credit and continuing education portions of a faculty member's job.

- **Standardizing credit hours**: For cost models at 4-year research institutions, the level of effort for teaching activities is calculated and assigned based on course credit hours. However, course credit hours are not applicable for continuing education or certificate classes. In order to address this issue and "standardize" credit and continuing education courses for direct comparison, JCCC leveraged the U.S. Department of Education continuing education unit (CEU) standard. According to the Department of Education, CEUs are awarded by many education and training providers to signify successful completion of non-credit programs and courses intended to improve the knowledge and skills of working adults. Among the most common uses of CEUs are to record refresher, transitional, or knowledge improvement accomplishments for professional workers undergoing what is called continuing professional education. The typical CEU represents approximately ten (10) contact hours of experience in a structured continuing education experience (class, seminar, retreat, practicum, self-study, etc.) that is supervised in some way by a qualified continuing education provider.

- **Standardizing management logic**: The continuing education program at JCCC has operated more-or-less autonomously for several years. In this time they have developed their own management systems related to cost and course timetable data, to meet the needs of managing their particular curriculum. These systems were very different from those leveraged by the credit programs. It will be an ongoing management focus at JCCC to ensure that the data for both credit and continuing education programs is managed in such a way that both sets of data can be loaded into the cost model.

Beyond credit and continuing education, numerous other differences were identified between the JCCC and UCR cost management model design and implementation projects. Some of these differences are related to the differences in mission between a 4-year research institution and community college, others related to data availability, while others were specific to the two campuses and their needs and interests. Identified differences, categorized by distinction, are discussed below:

- Observations and challenges related to differences in mission between 4-year research institution v. community college:
  - **Capital depreciation**: Due to the focus and nature of their missions, community colleges will have more capitalized technical equipment (e.g., welding equipment, kitchen equipment) that should be tracked and built into the model. Capital depreciation of buildings and large assets is incorporated into the 2015 JCCC model, however, at the time of the model build it was not possible to separately identify capital equipment for special treatment within the model.
  - **Definition of student success**: How to define student "successful completion" is more challenging at a community college because there are many differences in the definition of "success". At a 4-year research institution, "success" can generally be defined as successful completion of degree requirements. However, there are more motivations for community college students – some students do seek an associate's degree, but many build credits and transfer to a 4-year institution to pursue a bachelor's degree, or only take classes that will further their careers (and do not receive a degree). Transfer students typically apply as non-degree seeking or Liberal Arts majors with no intention of graduating. In the future, it is important for community colleges to more precisely track a student's objectives and whether or not the student successfully completed their objective(s) – for instance, successfully transferring to a 4-year school should be measured as "success".
- Observations and challenges related to data availability:
  - **Pass rates**: JCCC management was interested in tracking and analyzing pass rates of different courses, programs, etc. This data was available from the JCCC student enrollment and timetabling data, so was integrated in the model. This data was not available at UCR, and thus not incorporated in that model build.
  - **Granularity of course data**: Because of relative size, JCCC course data was mapped to the individual course reference number (CRN) level, leading to precise allocation of dollars, space, etc., to the individual course and section. At UCR, course information was tracked only to the course number; due to the size and scope of courses at UCR, it is not feasible to load all CRN data into the model.

- o **Distribution of faculty and course profile activities**: Through its work with the Benchmarking Institute, JCCC had defined and documented time against 5 "teaching" activities and 3 "other" activities that define how an academic spends her/his time. However, based on academic literature leveraged by UCR, a different set of activities was used for the UCR model build (course management is an additional activity, assessment and grading are broken out). In order to ensure consistent application of methodology between the two models, the two lists (below) needed to be reconciled in order to properly allocate faculty time.
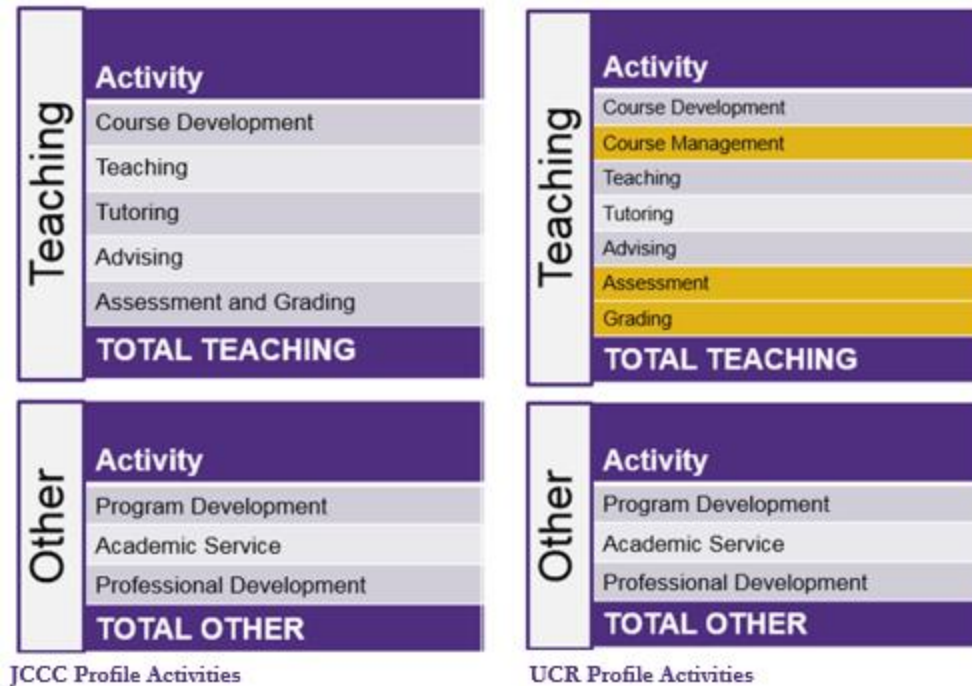

Figure 7. Faculty activity profiles

- Observations and challenges specific to the 2 specific implementations:
  - o **Space usage**: At the time of the model build, JCCC had recently completed a space utilization study. As such, space usage data was available and up-to-date for use within the model. To improve the accuracy, and potentially improve the ability to benchmark against other higher education institutions, JCCC employed an allocation methodology for assigned office space based on a recently determined space standard. The methodology used a space standard by personnel type (e.g. full-time hourly staff occupy 90 square feet while part-time hourly staff occupy 55 square feet) as the basis for allocating the costs of office space to personnel using the space. UCR allocated office space to personnel based on a full-time equivalent basis (e.g. a full time employee receives twice as much office space cost as a part time employee who works half-time).
  - o **Involvement from academic community**: From the outset of the UCR model build, the Provost was heavily engaged and committed to leveraging the outputs of the model to help drive more informed management decisions. Due to transitions in several key academic positions, including the Vice President for Academic Affairs, involvement from academic leadership was more limited at JCCC. While JCCC's model development team did work with Deans and faculty representatives, more involvement with the Vice

President for Academic Affairs is planned as implementation continues. Limited involvement from the academic community can lead to incomplete workload and course profile information, limited buy-in and acceptance of the model's objectives, and can limit the long-term effectiveness of the model (since key decision makers may not leverage the data).

CONCLUSION

JCCC served as a good compliment to UCR as a pilot project to implement higher education cost management models. Important insights were uncovered – both confirming methodology that can be applied to all higher education institutions, while also identifying key management differences between public 4-year research institutions and community colleges (as well as opportunities/challenges related to specific schools). Benchmarking the good work done at JCCC and UCR with additional public 4-year research and community college institutions will undoubtedly validate some of the information contained in this document, as well as identify additional insights that will help schools more effectively and efficiently manage their financial resources, allocating their activities in such a way to maximize the delivery of their missions to the greatest number of students possible.